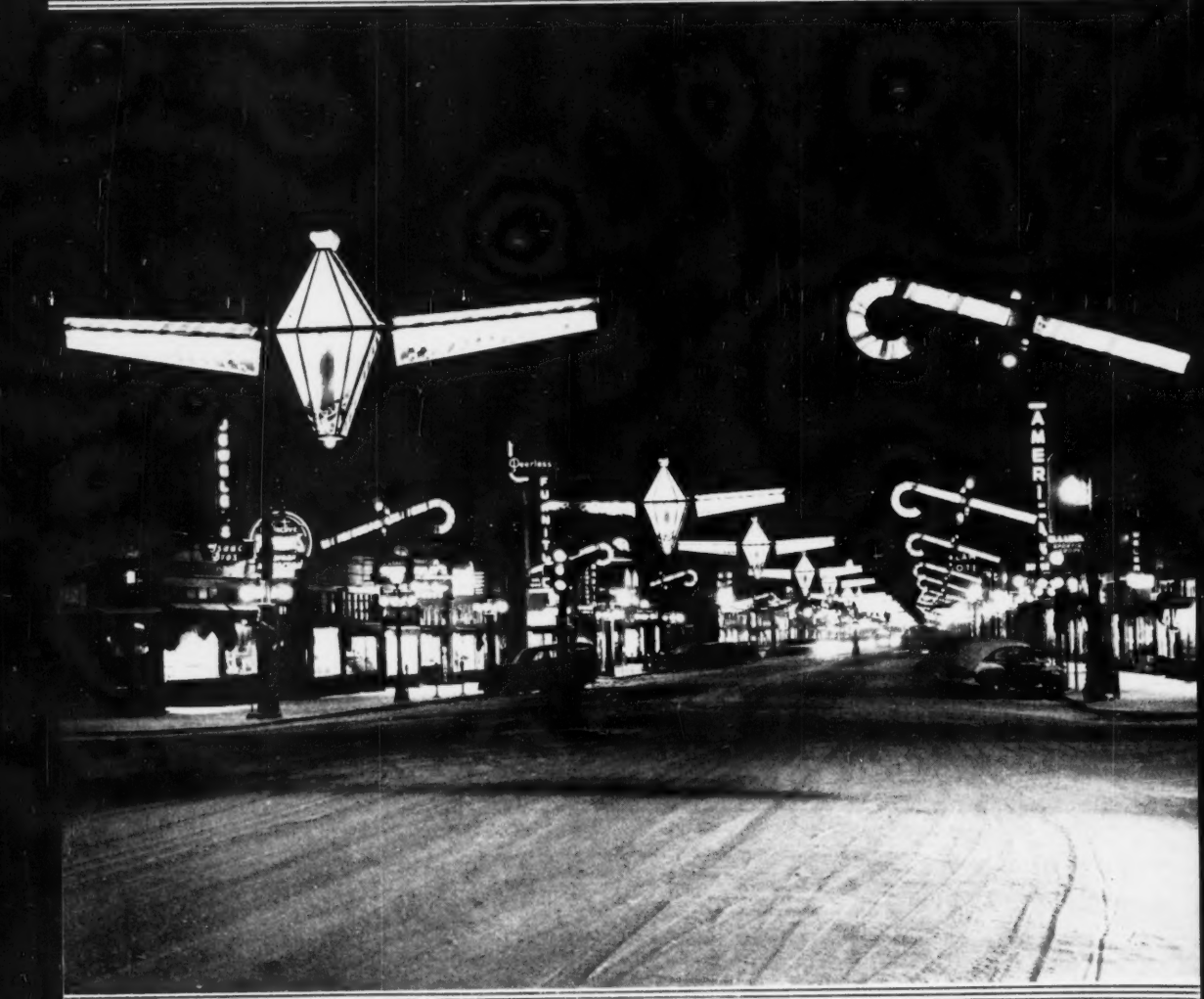
ELECTRICAL WEST

December 1949
25 Cents



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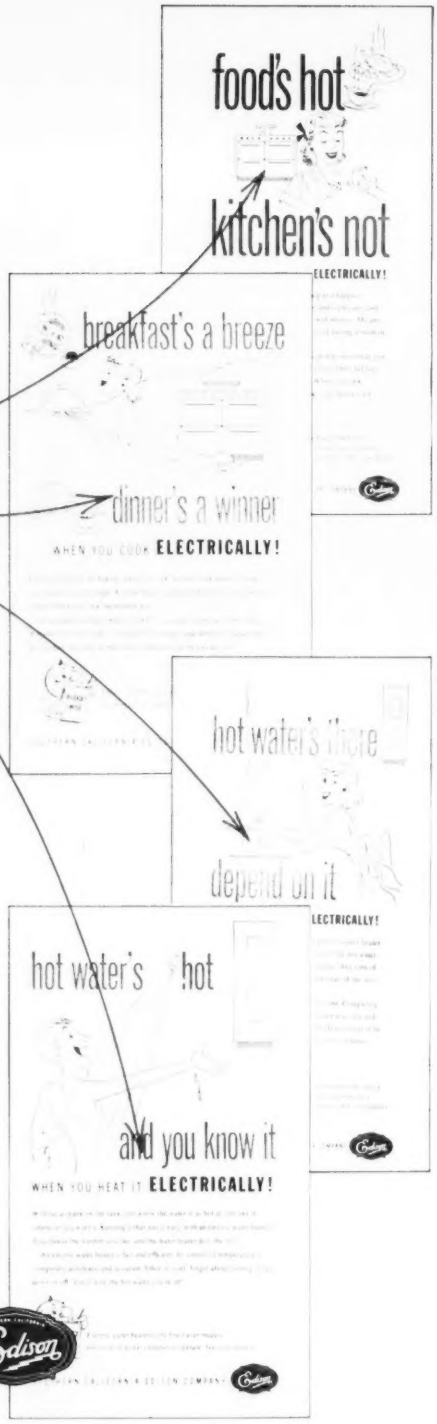
SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED REGION OF THE U. S.

cause and effect...

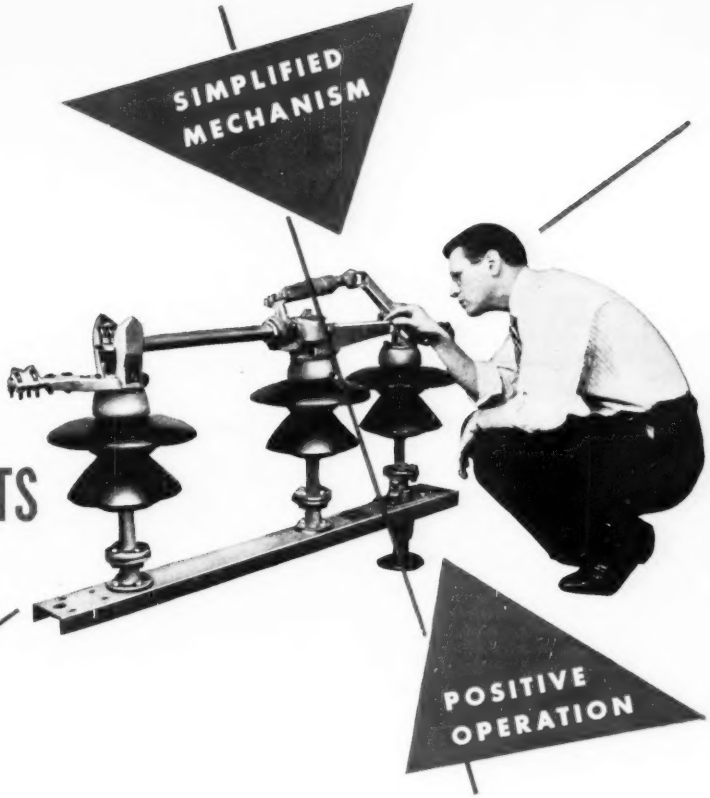


Not very many of your sales are made to people who just walk in and say, "An electric range, please!" Or who make an extra purchase with a casual "And I'll take an electric water heater, too!" The appliance business just doesn't work that way. It isn't anything like selling, say, loaves of bread. The bread buyer *knows* she wants bread, and knows she wants it *now*—that's the big difference.

Electrical appliance customers have to be made. And helping to make them for the appliance dealers of Central and Southern California has been the chief job of Edison advertising for more than half a century. In that time, we've found that more sales are made by stressing the effect of having a modern electrical appliance, and then translating that into the appliance itself. Better cooking, easier housework, added convenience—those are things the customer knows she wants. So even if it sounds like putting the cart before the horse, putting the effect before the cause gets you a lot farther!

Southern California Edison Company

TYPE RF DISCONNECTS



A COMPLETE LINE

. . . from 7.5 to 230 kv. For further details of these disconnects see your nearest G-E sales representative or write for bulletin GEA-4980 that pictorially shows the features of this switch in the new multi-exposure photo technique. *Apparatus Department, General Electric Company, Schenectady 5, New York.*

BLADE MECHANISM **has no cams or braids, is of simplified, easy-maintenance construction. Antifriction bearings are used on all main moving parts. This makes the switch exceptionally easy to operate at all times, especially under "glaze storm" and other severe weather conditions.**

SILVER-TO-SILVER **contact surfaces assure positive contact at all times and eliminate oxidation troubles that often cause annoying maintenance. You get power flow with no losses. This gives you a switch that doesn't overheat.**

STURDY CONTACTS **have U-shaped "fingers" with silver contact surfaces that are backed by noncurrent-carrying, stainless-steel springs. The housing, a strong casting, protects the fingers from dirt and ice.**

BASE **is a sturdy channel that will remain rigid even though the switch is put through high stresses under abnormal operating conditions. Also, Type RF switches are easy to line up on structures.**

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

DECEMBER 1949

SPOKESMAN FOR MOST HIGHLY ELECTRIFIED REGION OF THE U. S.
The all-industry magazine of progress, established 1887, and incorporating the "Electrical Journal," "Journal of Electricity, Power and Gas" and "Journal of Electricity." Contents copyright. Sixty-second year of publication

ELECTRICAL WEST

James H. McGraw (1860-1948), Founder
James H. McGraw, Jr., Chairman of the Board — George C. Tenney, President and Editor
W. A. Cyr, Associate Editor — Walter C. Heston, Engineering Editor
Peggy Boyer, Assistant Editor — R. A. Balzari, Publishing Counselor
John W. Otterson, Manager — John Cootz, Typography

Next Month

Starting off with the new year Electrical West will publish a Contractors News Letter in addition to the present informative Sales Letter. This should prove of great value to a large audience.

The general industry lead article for January will be loaded. It will deal with the U. S. Bureau of Reclamation's effort to control water in the state of Colorado. The bureau is claiming all upper Colorado River water and would condemn rights held by farmers, irrigation districts, municipalities and private utilities. Look for this revealing story.

Engineering treatment will be given to three new Western power projects—the city of Burbank's new steam plant, Pacific Gas and Electric Co.'s Cresta hydro plant, and the Toketee hydro plant of The California-Oregon Power Company. Another feature will describe labor-saving equipment and methods used by the Idaho Power Co. in building a new 138-kv. transmission line.

Experience with a residential heat pump on the Utah Power & Light system will be recounted. Other features will be a sports flood-lighting job and another industrial heating article from Los Angeles. Important association meeting reports will also be found.

Instead of the appliance Sales Guide, space will be given to more reports on dealer and sales activities.

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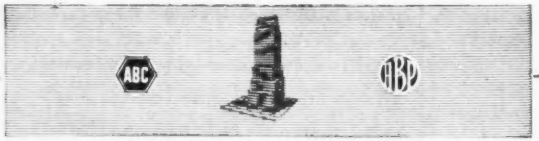
COVER PHOTO: Each year Electrical Contractor Matt Whitney of Colorado Springs designs, makes and installs downtown Christmas decoration. Last year the main street had this colorful appearance.

ADVERTISING REPRESENTATIVES

Chicago (11) ..... Philip S. Griffin, 520 N. Michigan Ave.
Cleveland (15) ..... Frank J. Seiler, 1510 Hanna Bldg.
Los Angeles (14) ..... W. D. Lanier, 621 S. Hope St., MI. 3691
New York (18) ..... John P. Eichorn, 330 W. 42nd St.
San Francisco (4) ..... Tom Carmody, 68 Post St., DO. 2-4600



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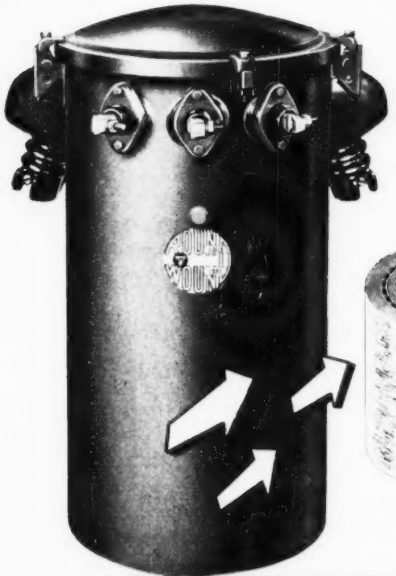
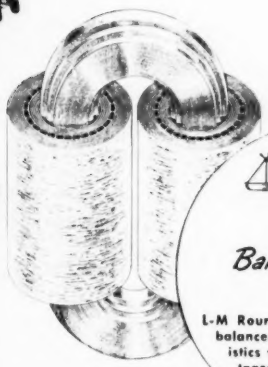
Cut failures... cut costs... with these features

of

L-M ROUND-WOUND TRANSFORMERS





High Short-Time Overload Capacity

Stepped core cross section provides oil passages between core and coil; these and the long round coils expose more surface to the oil, assuring better cooling.

High Impulse Strength

Coils are wound *round* right onto the core—no need to mallet coils into shape. Round coils can be wound tighter with better insulation distribution and improved impregnation, assuring higher average impulse strength.

Balanced Performance

L-M Round-Wound design provides balanced performance characteristics with their many advantages including better regulation, and high short circuit strength.

Quality Craftsmanship

Sealed tank construction, an L-M "first", is one of many quality construction features that assure long life for L-M Round-Wound transformers.

L-M Round-Wound transformers have a record of remarkably few failures—from all causes including lightning. This fact, together with their low operating cost, makes Round-Wounds a most desirable investment for both new construction and replacement of old, high-cost equipment.

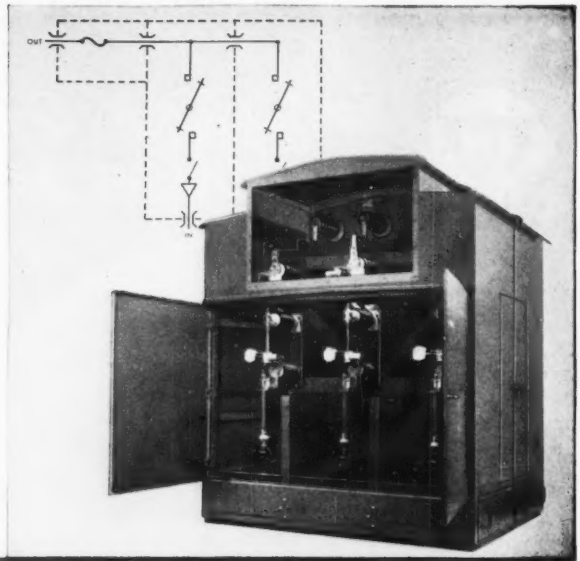
Want more information? Ask the L-M Field Engineer, or write Line Material Co., Transformer Division, Zanesville, Ohio.

LINE MATERIAL... TRANSFORMERS

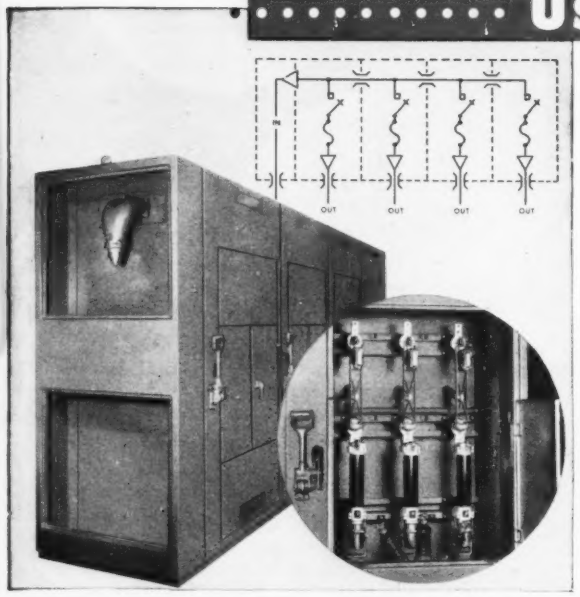
Complete Coordinated Equipment for All Distribution Requirements

WHERE HIGH VOLTAGE SWITCHGEAR MUST BE:

RELIABLE
ENCLOSED
PACKAGED
AND YET
LOW IN COST



USE S & C METAL-



Utilizing Alduti Interrupters and SM Power Fuses, S & C Metal-Enclosed Switchgear Units offer these important advantages:

● ***Large Savings in Equipment Costs*** as compared with circuit breakers, for Primary Switchgear, Secondary Switchgear, and Load Center Switchgear installations.

● ***Ease and Economy of Installation*** because all equipment within each unit—including meters, arresters, potheads, metering transformers, etc.—is factory assembled and connected. Incoming and outgoing connections are readily accessible.

CODE

Fuse — Disconnecting Switch

Lightning Arrester — Pothead

Meter — Through Bushing or wall opening

Potential Transformer

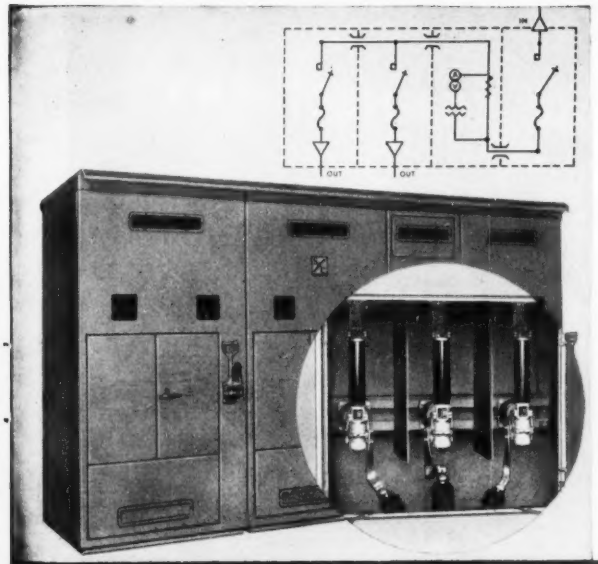
Current Transformer

S & C Alduti Interrupter Switch
Above 15,000 volts
15,000 volts and below

S&C ELECTRIC

Formerly SCHWEITZER & CONRAD, INC.

Harold J. Randolph, Los Angeles; Geo. E. Honn Co.,



Typical Performance Characteristics of S&C Metal-Enclosed Switchgear Units:

- ***Load Current Switching***... up to 600 amperes on 2,300- to 33,000-volt circuits.
- ***Magnetizing Current Switching***... of transformer banks whose load currents are within the continuous current ratings of the switches, that is, to 1200 amperes on 2,300- to 13,800-volt circuits and 600 amperes above 13,800- to 33,000-volt circuits.
- ***Charging Current Switching***... of three phase capacitor banks of 2,000 kvar on 2,300-volt circuits; and 3,000 kvar on 4,160- through 13,800-volt circuits.
- ***Short Circuit Protection***... to 40,000 amperes, rms asymmetrical, on 2,300- and 4,160-volt circuits; 30,000 amperes on 13,800-volt circuits; and 20,000 amperes on 33,000-volt circuits. Or, stated in symmetrical 3-phase kva: 104,000; 180,000; 448,000; and 715,000 respectively. For higher short circuit interrupting ability, consult the factory.

ENCLOSED SWITCHGEAR UNITS

- ***Minimum Maintenance Expense*** since a blown fuse is fully restored by simple field replacement of its refill unit. Also, in the average application, the switches require just ordinary switch maintenance.

Shown here are typical units from regular production. Any special design can be made to meet your specific requirements. To get this modern, reliable, money-saving switchgear for your next installation — consult the telephone directory for the S&C representative in your city, or write us direct.

COMPANY

4425 Ravenswood Avenue
Chicago 40, Illinois, U. S. A.

In Canada, Powerlite Devices, Limited, Toronto

San Francisco; Chas E. Klaus, Portland; Thomas S. Wood, Seattle

Get CORRECT CONDUIT CONNECTIONS

The easy economical way

Cross Section Showing Indentations

Select the best, insist on Briegel All Steel Fittings, the original approved Indenter type connectors and couplings for thin wall conduit tubing. You will not only find that Briegel Indenter Fittings are easier and faster to use, but also make neater, stronger connections, the correct connections. Two Easy Squeezes and they're set. Start using Briegel Fittings today. Have more satisfied customers—more profits from each job.

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The M. B. Austin Co., Northbrook, Ill.; Clayton Mark & Co., Evanston, Ill.; Clifton Conduit Co., Jersey City, N. J.; General Electric Co., Bridgeport, Conn.; The Steelduct Co., Youngstown, Ohio; Enameled Metals, Pittsburgh, Penn.; Kondu Mfg. Co., Ltd., Preston, Ont.

• NEATER • STRONGER • FASTER • APPROVED

All B-M Fittings Carry the Underwriter's Seal of Approval and Canadian Standards Ass'n Approval No. 9296

BRIEGEL METHOD TOOL CO.

GALVA, • ILLINOIS

A STORY IN TWO PARTS . . . PART 2*

HOW OKOMETAL of reduced thickness PLUS OKOSHEATH Protective Covering

...provides 6 major advantages to paper cable users

*Continued from November 1949 issue of ELECTRICAL WEST.

Okometal of reduced thickness plus Okosheath Protective Covering is a composite sheath of alloyed lead protected by a tough, reinforced neoprene covering vulcanized and firmly bonded to the lead. The result of long, intensive studies in Okonite-Callender Research Laboratories, this dual sheath provides six major advantages to a growing list of users.

In the previous issue of this magazine, we indicated how Okometal-Okosheath *doubles life expectancy, eliminates corrosion in lead-sheathed paper cables* and *reduces installation and maintenance costs.* The following three advantages complete the reasons why you should specify Okometal of reduced thickness plus Okosheath Protective Covering:

COMPARISON OF RELATIVE STRUCTURAL VALUES: With Okosheath Protective Covering, the 15% extra lead thickness normally required for scoring protection can be eliminated. The greater bursting strength, excellent creep resistance and increased resistance to bending fatigue of Okometal make a further reduction possible. Result: an over-all reduction of one-third in metal thickness still provides doubled life expectancy when this dual sheath is used.

HAS GREATER BURSTING STRENGTH: Internal pressure tests show that Okometal itself possesses higher bursting strength than ordinary lead sheaths, as well as excellent resistance to creep. The composite sheath with Okometal of reduced thickness withstands pressure tests three times as long as bare lead sheaths of standard thickness.

PREVENTS SCORING OF LEAD: A comparison of structural values (see diagram) shows how all the sheath metal is effective when Okosheath Protective Covering is used, and that no extra metal need be furnished for potential scoring damage. Okometal's greater bursting strength and resistance to creep and bending fatigue also contribute to making possible the one-third reduction of metal thickness while maintaining the same doubled life expectancy.

MAKES PULLING EASIER: Cables made with Okometal of reduced thickness plus Okosheath Protective Covering are easier to pull and handle because of their lower coefficient of friction and lighter weight. This suggests the use of longer cable lengths to reduce the number of manholes and joints. The metal sheath is also protected against damage during installation.

Comparative test results, explanatory diagrams and photographs, as well as more detailed information on this important development are available in Research Publication 110. Just write for your copy on your business letterhead. The Okonite Company, Passaic, N. J.

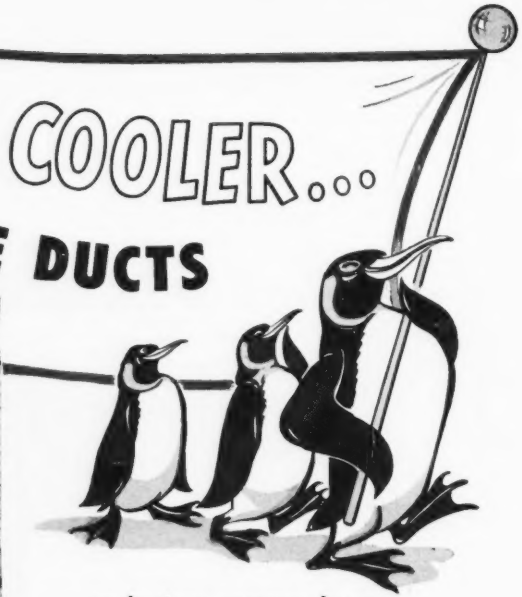
Compare this substantial dual construction with plain lead of same core diameter.

Okonite-Callender cables with this composite sheath meet all AEIC Test requirements for paper cables with plain lead of standard thickness.

7678

OKONITE-CALLENDER power insulated power cables

Cables run COOLER...
in TRANSITE DUCTS



... reducing copper losses
... increasing current capacity
... prolonging insulation life

YOU REDUCE copper losses ... increase current carrying capacity ... and prolong insulation life, when you run your cables in Transite* Ducts.

Current carrying capacities can be increased in a typical duct bank as much as 5%, or I^2R losses can be reduced 11%, for cables located in Transite as compared with other ducts used for power circuits.

And, Transite Ducts assure permanent duct banks because Transite is incombustible; is immune to rust and rot; is unaffected by electrolysis; will not slag under action of an arc, and will retain its high original strength.

An unusually smooth bore assures no injury to cable sheath, either in natural movement under load, or when pulling-in cables. Long, lightweight lengths can be quickly and economically installed. In addition, a full line of fittings simplifies even the most complicated of installations.

For full information on Transite Ducts, write for Data Book DS-410. Johns-Manville, Box 290, New York 16, N. Y.

*Reg. U. S. Pat. Off.

How Transite Ducts increase current carrying capacities

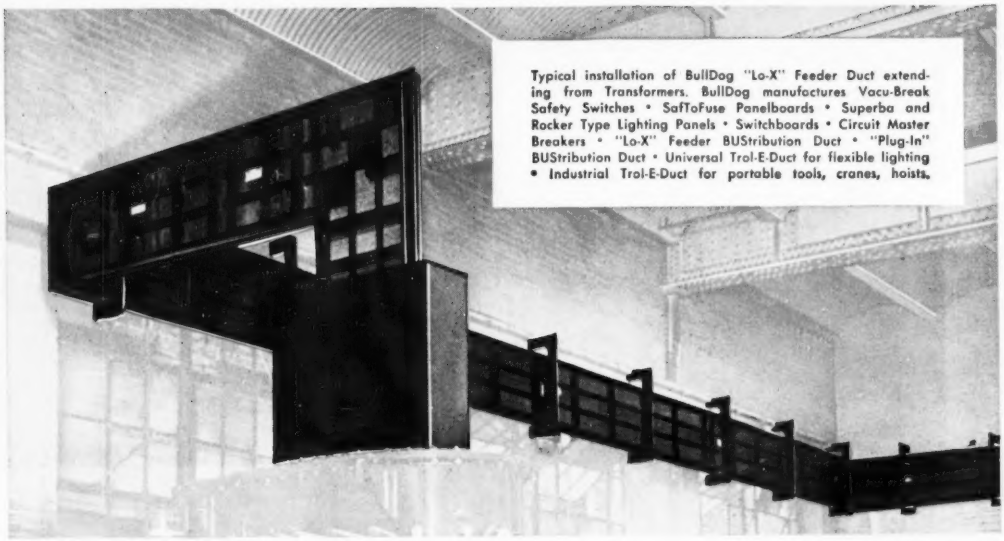
Type cable 3 cdr. 500 MCM Compack Sector, 15 KV (6th Edition AEIC Spec.)
No. of cables—3 (all loaded in one bank)
Daily Load Factor—75%
Earth Temp. ambient—20 C

	Transite	Other
Total Therm. Res. to Dielectric Loss (C watts/ft.)	5.66	6.17
Total Therm. Res. to Copper Loss (C watts/ft.)	4.44	4.95
Temp. Rise from Dielectric loss (C)	1.9	2.1
Allowable Rise for Copper loss (C)	59.1	58.9
Allowable Watts per ft. cable	4.44	3.96
Allowable Current—(Amps. per cdr.)	386.	365.
Allowable Current—(Relative %)	105.6	100.

Johns-Manville *Transite Ducts*

TRANSITE KORDUCT—for installation in concrete

TRANSITE CONDUIT—for exposed work and installation underground without a concrete encasement



Typical installation of BullDog "Lo-X" Feeder Duct extending from Transformers. BullDog manufactures Vacu-Break Safety Switches • SafToFuse Panelboards • Superba and Rocker Type Lighting Panels • Switchboards • Circuit Master Breakers • "Lo-X" Feeder BUStribution Duct • "Plug-In" BUStribution Duct • Universal Trol-E-Duct for flexible lighting • Industrial Trol-E-Duct for portable tools, cranes, hoists.

No power pirates in this feeder system!

POWER pirates . . . ? Yes, such as Excessive Temperature Rise, and High Reactance Voltage Drop. They specialize in robbing you of electrical power! In BullDog "Lo-X" BUStribution Duct, they are kept under control.

BullDog "Lo-X" BUStribution Duct is built with a ventilated casing and special bus bar arrangement. Ventilation allows conductor heat to pass off into the air; closely spaced "paired-phase" bus bars reduce reactance, hold voltage drop to a minimum.

"Lo-X" Duct is adaptable to almost any power distribution setup. Standardization means *known* performance . . . even before installation. Prefabricated, factory-built units mean real savings in initial installation. Also, you can revamp a BullDog "Lo-X" BUStribution Feeder System to fit any change in plant arrangement, without scrapping a single part!

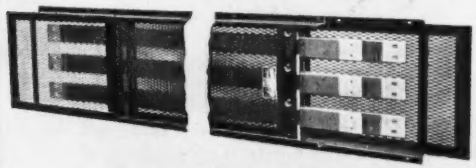
Underpowered equipment due to "power pirates" in your feeder system may be costing you plenty. Call in a BullDog Field Engineer. He will gladly answer your questions and show you an installation of "Lo-X" in your neighborhood.

BullDog Field Engineers welcome the opportunity to sit in with you during the early planning stages of a building project. Their knowledge of electrical distribution layout can mean savings in installation costs, as well as efficiency and reliability in actual operation. Why not take advantage of this service?

BULLDOG ELECTRIC PRODUCTS COMPANY
DETROIT 32, MICHIGAN—FIELD OFFICES IN ALL PRINCIPAL CITIES
IN CANADA: BULLDOG ELECTRIC PRODUCTS OF CANADA, LTD., TORONTO

BULLDOG

HEADQUARTERS FOR ELECTRICAL DISTRIBUTION



Section of BullDog "Lo-X" BUStribution Duct, showing the ventilated nature of the steel-mesh casing. Wrapped bus bars, utilizing air as the main dielectric, are mounted on porcelain insulators in "paired-phase" arrangement. "Lo-X" BUStribution Duct is made in capacities from 600 to 4000 Amps.; 600 Volts or less; 2, 3, and 4 poles.

CONSULT THE FOLLOWING PACIFIC COAST REPRESENTATIVES:

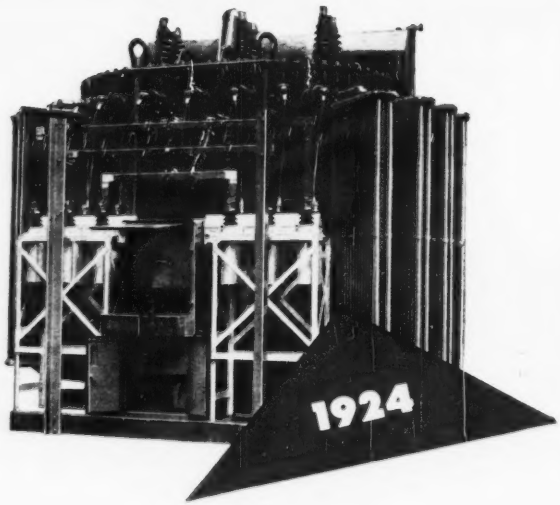
Coast Electric & Manufacturing Co.
1720 N.E. Sixth Avenue Tel. Garfield 2844
Portland 12, Oregon

Safety Switchboard Company
1445 Stevenson St. Tel. Hemlock 1-2470
San Francisco 3, Calif.

Mullenbach Electrical Manufacturing Co.
2300 East 27th Street Tel. Logan 5-5331
Los Angeles 11, Calif.

Look what's

It's a far cry from this transformer, built in 1924, to the 1949 design on the opposite page. The obvious difference is the much better appearance. But of more significance are the internal improvements.



That transformer of 25 years ago was the start toward making load-ratio-control as reliable as the transformer itself. In it, tap selector switches were used in combination with separate arcing and current-carrying contacts (external circuit breakers in 1924). About the same time, General Electric introduced the bridging of tap sections by a reactor having an air gap, thereby preventing dangerous overvoltages. These basic practices have made practical the large load-ratio-controlled transformers of today.

OTHER G-E ADVANCES

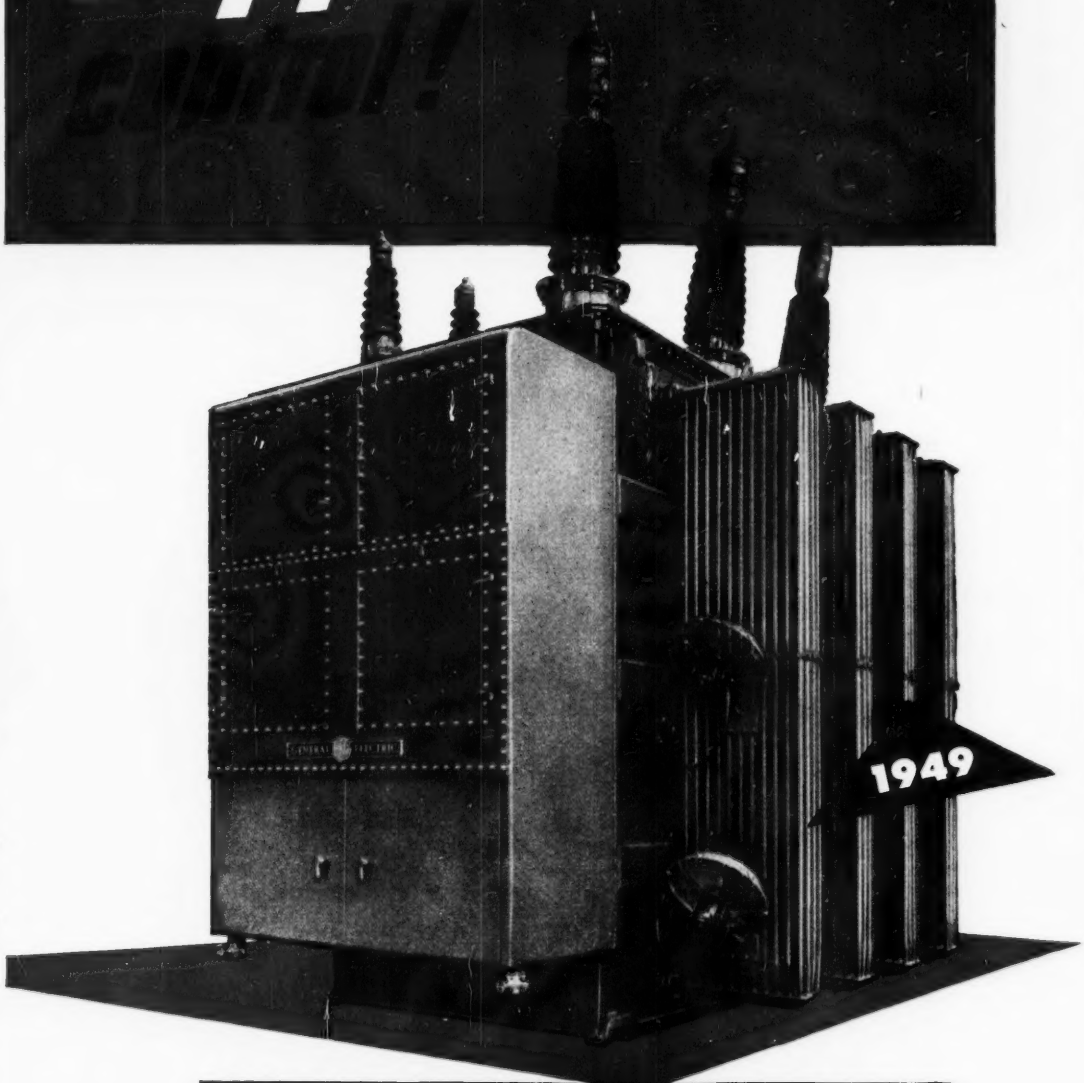
Other G-E introduced practices have also been generally adopted. Load-ratio control equipment is now designed to function properly under overload conditions. Sequence of operation of contacts and selectors is now mechanically interlocked. In larger transformers, arcing is confined to special contacts housed separately from the main tank. All in all, today's equipment for changing taps under load is so reliable that it can unhesitatingly be specified whenever needed. More than a third of all recently built large G-E transformers are so equipped.

However, in our opinion it still takes experience to build such equipments—experience that can't be acquired in a short time. It has taken us 25 years to learn all we know about it—and the experience of building and watching the performance of almost 25,000,000 kva of such equipment.

We have perfected nine different mechanisms for various ratings of transformers to be sure that you get maximum reliability under all conditions—even after hundreds of thousands of operations. Thus, the story of load-ratio-control shows again that you can put your confidence in General Electric.

Apparatus Dept., General Electric Company, Schenectady 5, N. Y.

happened....

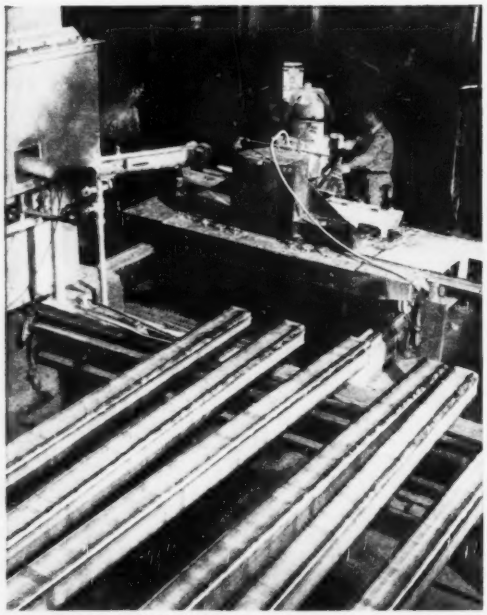


GENERAL ELECTRIC

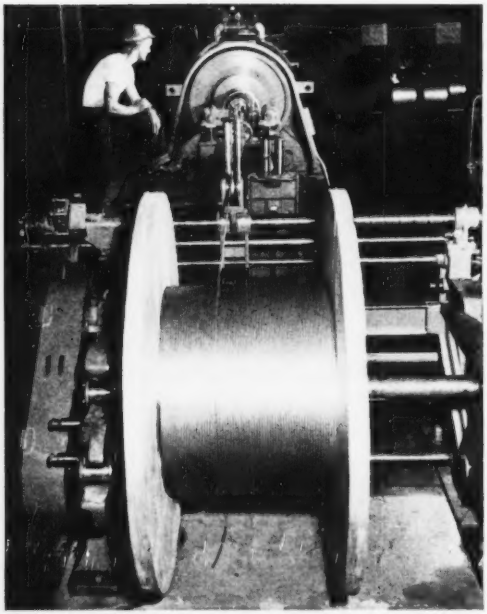
401-5

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

From start . . . to finish . . .



AT KAISER ALUMINUM'S Newark, Ohio plant, the production of high quality Kaiser Aluminum conductor starts in the remelt department. Here high purity pig from its own reduction plants is remelted and cast into 99.5% purity ingots 6" square and 12' long. These pass through a series of automatic break-down and finishing mills to become rod ready for wire drawing.



ROD IS DRAWN into wire on the most modern equipment in the electrical conductor industry. High speed cable stranders, manned by skilled personnel, produce the finished conductor, which has been tested at every step by modern methods and equipment. Result of this completely integrated production control is pictured above—aluminum conductor of unsurpassed quality!

Controlled for quality!

As important as the high quality of Kaiser Aluminum Conductor is the consistently dependable deliveries assured by Kaiser Aluminum's centrally located Newark, Ohio plant.

Early delivery schedules of all sizes of ACSR and all-aluminum conductor are now open. For immediate information, contact any sales office listed below.

Produced by Kaiser Aluminum & Chemical Corporation.

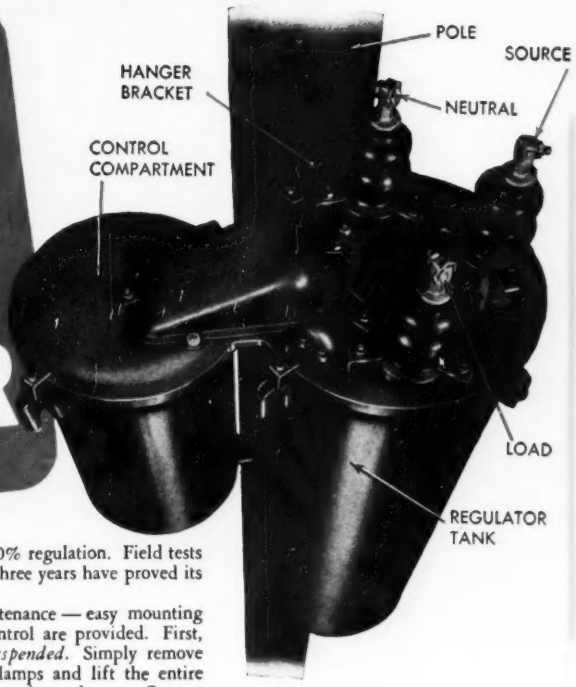
Kaiser Aluminum

CONDUCTOR

SOLD BY KAISER ALUMINUM & CHEMICAL SALES, INC., KAISER BUILDING, OAKLAND 12, CALIF. . . . OFFICES IN:
Atlanta • Boston • Chicago • Cincinnati • Cleveland • Dallas • Denver • Detroit • Houston • Indianapolis • Kansas City • Los Angeles
Milwaukee • Minneapolis • New York • Oakland • Philadelphia • Portland, Ore. • Rochester, N. Y. • Seattle • Spokane • St. Louis
Wichita • *Also available through General Electric Supply Corporation, Westinghouse Electric Supply Co., and Line Material Co.*

Keep Voltage Constant on Rural Lines!

NEW ALLIS-CHALMERS Pole-Type VOLTAGE REGULATOR



- ✓ **Improves service — cuts complaints**
- ✓ **Provides full 20% range of regulation (10% raise and lower)**
- ✓ **Ups revenue by increasing line and system capacity.**
- ✓ **Costs but a few dollars per customer on average line**

FOR THE FIRST TIME, you can get complete voltage regulation for rural lines at low cost. Here's an economical, flexible method for keeping voltage constant at a point on a line, regardless of load changes or cause of voltage difficulties.

The New Pole Type voltage regulator is fully automatic . . . regulates line voltage through a range of 20% in 32 small 5/8% steps, and holds ± 1 volt band. Rating is 10.8 kva, 15 amp., 7200 v, ± 10% regulation. Field tests for the past three years have proved its reliability.

Easy maintenance — easy mounting — simple control are provided. First, it is *cover-suspended*. Simply remove four cover clamps and lift the entire regulator from the tank. . . . Contact life is long. Quick-break mechanism eliminates arcing and pitting. In addition, because of small 5/8% steps, contacts interrupt smaller kva — last longer. Unit is mounted on pole as easily as distribution transformer. Control requires just two simple knob adjustments to set.

Ask an Allis-Chalmers field engineer to determine the best means of improving voltage conditions on your rural system using voltage regulators. Contact a nearby A-C district office or send in the coupon.

WRITE FOR NEW BULLETINS

ALLIS-CHALMERS, 939A SO. 70 ST. MILWAUKEE, WIS.

☐ Send me descriptive bulletin 6424, plus "When and Where to Apply Rural Voltage Regulators" bulletin 6409.

☐ Have engineer call.

Name.....

Title.....

Company.....

Street.....

City.....

State.....

A-2780

ALLIS-CHALMERS

Pioneers in Power and Electrical Equipment from Generation through Utilization

A-C ALLIS-CHALMERS

NEW BY

SERIES 5200

SERIES 5200 STRAIN CLAMPS

CATALOG NUMBER	MAX. CABLE DIA.	FITTING	ULTIMATE STRENGTH
5200 5210	.55"	Socket Clevis	10,000
5201 5211	.68"	Socket Clevis	15,000
5202 5212	.84"	Socket Clevis	20,000
5203 5213	.96"	Socket Clevis	30,000
5204 5214	1.10"	Socket Clevis	30,000
5205 5215	1.28"	Socket Clevis	35,000

Send For New Catalog

BTC's new catalog of Drop-Forged Hi Line Hardware will soon be coming off the press. It's chuckful of information you'll want to have on hand—pictures, blueprints and complete specifications on Brewer-Titchener's entire line of Drop Forged Steel, Aluminum and Bronze Hi-Line Hard-Ware. Write today.

THE largest manufacturer of Drop-Forged Steel Transmission Line Conductor Clamps and Fittings, after a thorough investigation of materials, development of production techniques, and installation of new, modern, and efficient manufacturing facilities, now offers a complete new line of Minimum-Power-Loss (M.P.L.) Suspension and Strain Clamps for use on A.C.S.R. and all-aluminum conductors.

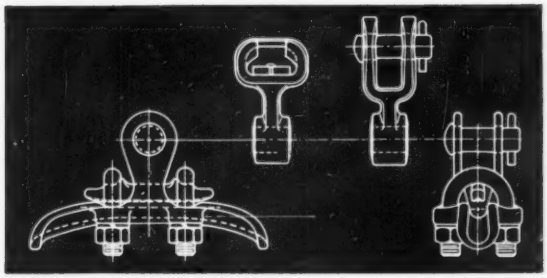
On high-current transmission lines, the use of magnetic ferrous clamps, completely enclosing the conductor, causes considerable hysteresis and eddy current power losses. The conductor heating and annealing effects of such clamps has been the current-limiting factor on some transmission systems

In the clamps listed here, the magnetic path around the conductor is effectively broken by the use of non-magetic clamp bodies, and power losses, even on heavily loaded lines are negligible—the temperature of the conductor in the clamped section may well be lower than that in the span, due to the greater radiation surface of the clamp assembly.

The general design closely follows that of the time-tested B.T.C. Drop-Forged Steel Clamps, retaining all of their desirable features—Reduction of the effects of conductor vibration by light weight, short connecting length, and smooth die-forged clamp seats with

DROP-FORGED ALUMINUM M-P-L * CLAMPS

BTC



* *Minimum-Power-Loss*

SERIES 9500

ample cable-supporting length and large snubbing radii —Bell-mouthed corona-free large-radius beaded ends.

A wide range of sizes makes possible the selection of exactly the right clamp to fit properly the conductor.

The Suspension and Strain Clamp bodies are Drop-Forged from high strength Aluminum Alloy and are heat-treated, with all of the desirable physical properties of parts produced by these processes—superior strength and resistance to shock and fatigue without excessive mass and weight—uniformity and refinement of internal structure—lasting reliability in service —close dimensional fidelity—excellent finish and appearance.

Clamping Keepers and fully machined Connectors are Drop-Forged Steel.

Connecting Pins, Clamping Bolts, Nuts and Lock Washers are steel.

All ferrous parts are hot-dip galvanized.

Rated ultimate strengths are more than adequate for use on conductor sizes accommodated.

Further information on request.

SERIES 9500 SUSPENSION CLAMPS

CATALOG NUMBER	MAX. CABLE DIA.	FITTING	ULTIMATE STRENGTH
9503 9533 9543	.83"	Socket Clevis None	18,000
9504 9534 9544	1.00"	Socket Clevis None	22,000
9505 9535 9545	1.15"	Socket Clevis None	22,000
9555 9565 9575	1.27"	Socket Clevis None	25,000
9506 9536 9546	1.375"	Socket Clevis None	25,000
9557 9567 9577	1.45"	Socket Clevis None	25,000
9507 9537 9547	1.60"	Socket Clevis None	25,000
9508 9538 9548	1.80"	Socket Clevis None	25,000
9509 9539 9549	2.00"	Socket Clevis None	25,000
9510 9580 9590	2.25"	Socket Clevis None	25,000

Sold through your insulator manufacturer only.

THE BREWER-TITCHENER CORPORATION, CORTLAND, NEW YORK

Testimonial for free enterprise

WE started in a blacksmith shop 90 years ago. One of our first jobs in supplying wire was for a fellow named Morse who invented the telegraph. Mr. Morse became one of our very good customers. He also brought us one of our first problems in cable manufacture, and that was finding a good insulating material that would withstand heat and cold, light, wind, weather, water, etc.

Mr. A. G. Day solved the problem with an invention called Kerite—an ingredient which is responsible for the remarkable performance of Kerite insulation. Some early Kerite cable—made nearly 70 years ago—is still in first-class condition.

Kerite made to the old formula is still used in our insulation. That is what makes Kerite insulation such a good buy today—it gives long service at a low cost per year.

The Kerite Company grew out of a need—and has continued growing because it continues to fill a need. That is the way our Free Enterprise system works.

We think Kerite is a good testimonial to American Free Enterprise. And we will constantly endeavor to merit the continued confidence of the people we have served under that system during the last 90 years. The Kerite Company, 30 Church Street, New York 7, N. Y.

Kerite Insulation—Your Cable's Best Life Insurance

DAY KERITE

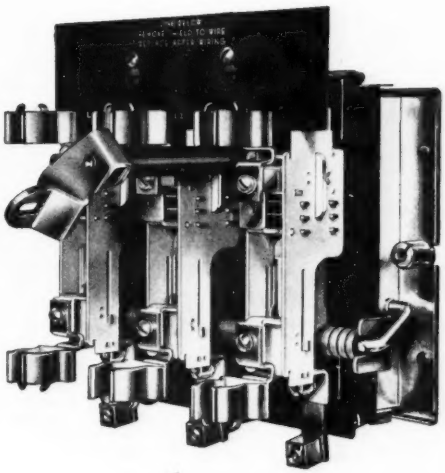
KERITE CABLE

NOW... an ALL-NEW Type A Safety Switch for modern high-capacity distribution systems...

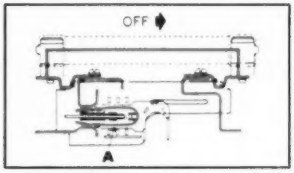
TRUMBULL'S HCI

HIGH **C**APACITY **I**NTERRUPTER

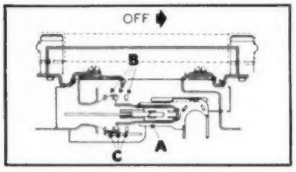
Unusually high interrupting capacity . . . "circuit-breaker" action breaks heavy loads quickly, safely. Extremely high momentary current capacity . . . withstands heavy short circuits without damage. 30-, 60-, 100-ampere sizes.



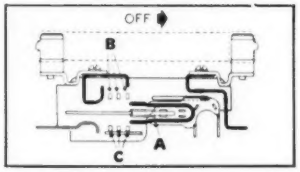
Here's How...
HCI's "Circuit-Breaker" Action Works



1. Switch closed. Spring-loaded sliding contact (A) fully inserted between stationary contacts. Red indicates current.



2. Sliding contact being withdrawn. The two arcs repel each other, are drawn against grid pins (B) and (C), which break and cool them.



3. Contact fully withdrawn. Trumbull's unique "Circuit-Breaker" action has effectively extinguished the arcs.

CHECK THESE ADDITIONAL SPACE-SAVING, TROUBLE-PREVENTING, LIFE-LENGTHENING FEATURES

Center-front operation permits close ganging.

Front fusing allows compact box, yet gives ample wiring space.

No exposed live parts when switch is OFF and door is open.

Handle interlock.

Clear ON and OFF markings both inside and outside.

No dead center—roller-cam action (multiplying linkage design with powerful spring) throws switch to full OFF and ON.

Poles are self-contained switching units for easy replacement.

Silver-plated current-carrying parts prevent oxidation . . . give low-resistance contact.

Insulating parts made of linen melamene, light, strong, arc-resisting.

Enclosed operating mechanism (on 60- and 100-amp. sizes) prevents wire chafing.

Interior removable for wiring ease.

Underwriters' approval throughout.

For more information about Trumbull's all-new HCI Safety Switch, write for your free copy of Bulletin TEC-10 today. THE TRUMBULL ELECTRIC MANUFACTURING COMPANY, Plainville, Connecticut.

Men Who Observe the Best Electrical Practice Make It a Practice to Use

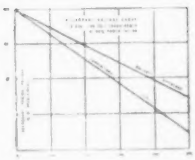
TRUMBULL (T) ELECTRIC

TRUMBULL'S TRAINLOAD OF NEW PRODUCTS

The inside story about MOLONEY HiperCore DISTRIBUTION TRANSFORMERS

The inside story about Moloney HiperCore Transformers is centered around the material used in the cores. By using highly efficient oriented silicon steel it is possible to work the cores at higher flux densities than formerly. With the *total* flux requirements remaining practically unchanged, working the oriented steel at higher densities than practical with ordinary silicon steel, results in smaller cross-sectional areas of cores with a consequent reduction in weights.

The smaller cores permit the use of smaller windings, smaller tanks and less oil. This results in lighter weight and smaller transformers which are easier to install and handle generally, and take up less space on the poles. Reductions in size and weight have been made without sacrifice in all-around performance. In fact, HiperCore Transformer operating characteristics are better . . . voltage regulation has been improved . . . greater short-time overloads can be carried.

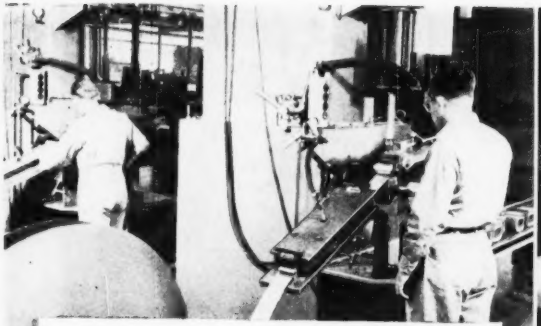


Illustrated are a few of the operations involved in the manufacture of HiperCore Transformers indicating the careful attention given to every detail in order to assure unexcelled on-the-job performance.

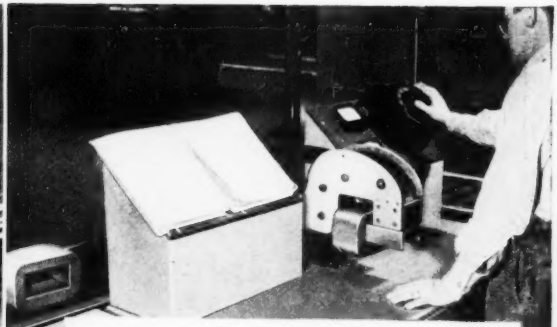
ME49-10

Testing voltage ratios at various tapchanger settings, to make certain that tap leads have been connected to proper studs, and that inter-coil connections are correct.

Placing core-and-coil assemblies in tanks after they have passed through oven which removes any moisture which may have been absorbed from the air, and also cures adhesive on core faces.



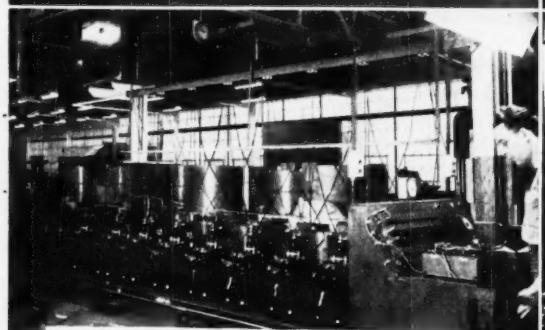
Cores are wound of oriented silicon steel. Winding machines are semi-automatic, stopping when proper thickness of winding is reached. End of core strip is spot welded.



Following winding of the cores, they are annealed in bell-type furnaces in a nitrogen atmosphere and are then given an initial test for losses as illustrated above.

Placing windings into position over U-shaped core pieces. Prior to this operation, cores have been impregnated, baked, cut, etched, and tested a second time.

Connecting tap leads from winding to tapchanger studs. On opposite side of assembly line, terminals are brazed to low voltage leads. Previous operations included applying adhesive to core faces, banding core pieces, and attaching frames.

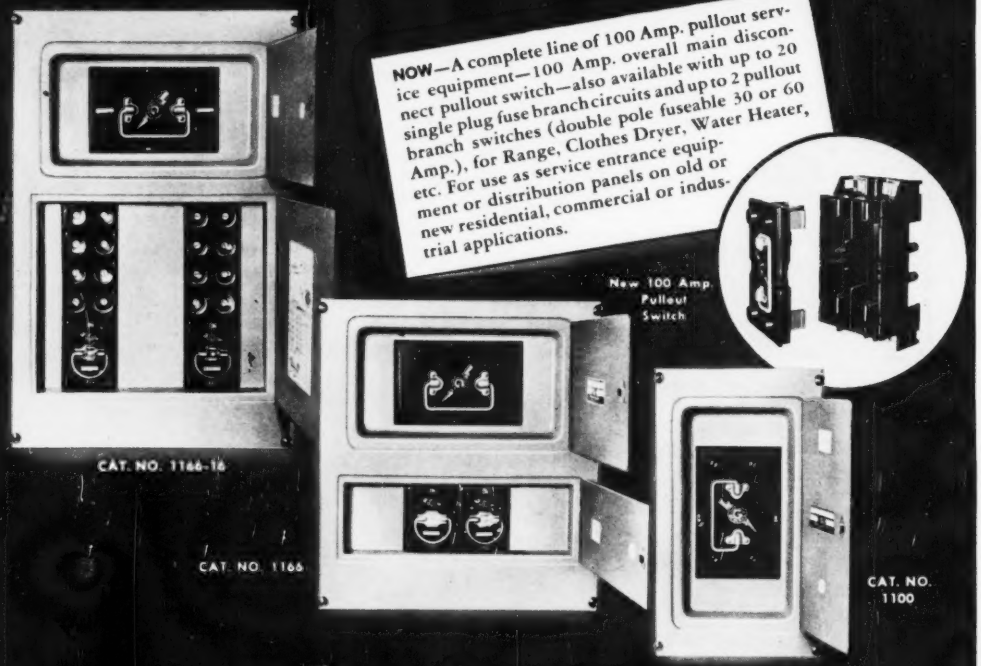


After bushings have been installed, the tanks filled with oil, and the transformers vacuum treated to remove any entrapped air from the oil or windings, final electrical tests are made.

MOLONEY
ELECTRIC CO.
Sales offices in all principal cities
FACTORIES AT ST. LOUIS 20, MO.
AND TORONTO, ONTARIO, CANADA

The latest reason why the Switch is to General

NOW—A complete line of 100 Amp. pullout service equipment—100 Amp. overall main disconnect pullout switch—also available with up to 20 single plug fuse branch circuits and up to 2 pullout branch switches (double pole fuseable 30 or 60 Amp.), for Range, Clothes Dryer, Water Heater, etc. For use as service entrance equipment or distribution panels on old or new residential, commercial or industrial applications.



Service Equipment with 100 Amp. Main Disconnect

GENERAL'S new 100 Amp. pullout service equipment is modern in design, appearance and performance and the latest result of General's long range product development program. Examine the construction features of this new equipment at your earliest opportunity. Available everywhere exclusively through wholesalers.

General Switch Corp.

49 Roebling Street Brooklyn 11, N. Y.

SALES OFFICES IN EVERY MAJOR CITY

Have you seen . . .

. . . the new light gray baked enamel finish on all items in the General line?

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. . . the way General packages most items in individual cartons?

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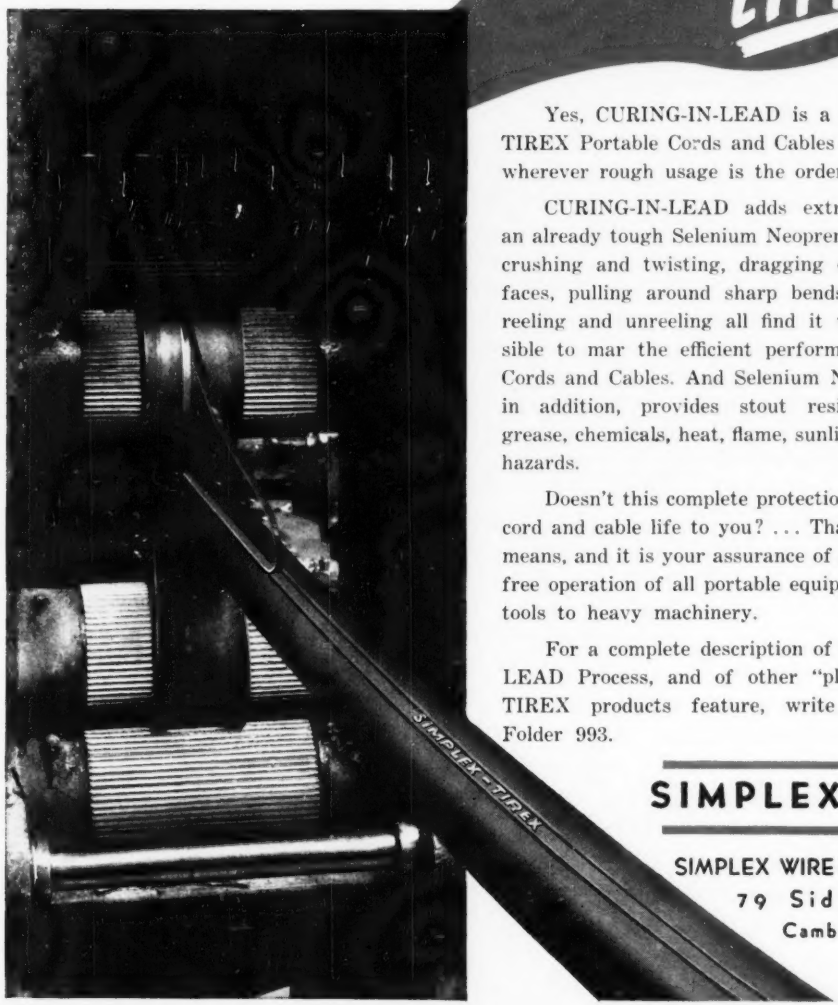
. . . the new designs with more knockouts and knuckle room?

The New catalog supplement 4911 completely describing the 100 and 200 Amp. lines?

The latest General Switch Catalog 4809 with price list supplement 4905?

Ask your wholesaler or write today!

Adding Years to TIREX CORD & CABLE LIFE



Yes, CURING-IN-LEAD is a big reason why TIREX Portable Cords and Cables stand up longer wherever rough usage is the order of the day.

CURING-IN-LEAD adds extra toughness to an already tough Selenium Neoprene jacket so that crushing and twisting, dragging over rough surfaces, pulling around sharp bends, and continual reeling and unreeling all find it well-nigh impossible to mar the efficient performance of TIREX Cords and Cables. And Selenium Neoprene Armor, in addition, provides stout resistance to oils, grease, chemicals, heat, flame, sunlight and weather hazards.

Doesn't this complete protection suggest longer cord and cable life to you? . . . That's just what it means, and it is your assurance of low-cost trouble-free operation of all portable equipment from hand tools to heavy machinery.

For a complete description of the CURED-IN-LEAD Process, and of other "plus" values that TIREX products feature, write us today for Folder 993.

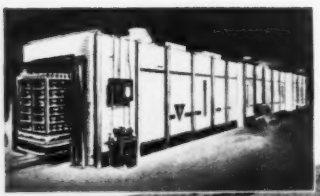
SIMPLEX-TIREX

SIMPLEX WIRE & CABLE CO.
79 Sidney Street
Cambridge 39, Mass.

Craftsmanship and Modern Engineering

Result in

VICTOR'S Steady Growth



Kiln No. 4 Completed in 1949

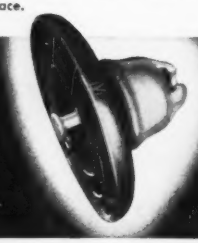
Modernized VICTOR plant with over 300,000 sq. ft. of manufacturing space.

VICTOR'S skilled craftsmen, many of whom have been making high quality insulators at Victor for over forty years, take *pride* in their workmanship. It is this pride, *plus* modern ceramic and electrical engineering, *plus* advanced manufacturing equipment that have brought about Victor's steady growth.

The addition of another oil-fired tunnel kiln early this year has enabled Victor to step up the production of its high voltage porcelain insulators—insulators famous for their superior, *on-the-job performance*. And with its large modern factory, Victor is now better equipped than ever to fill your standard or special porcelain requirements.

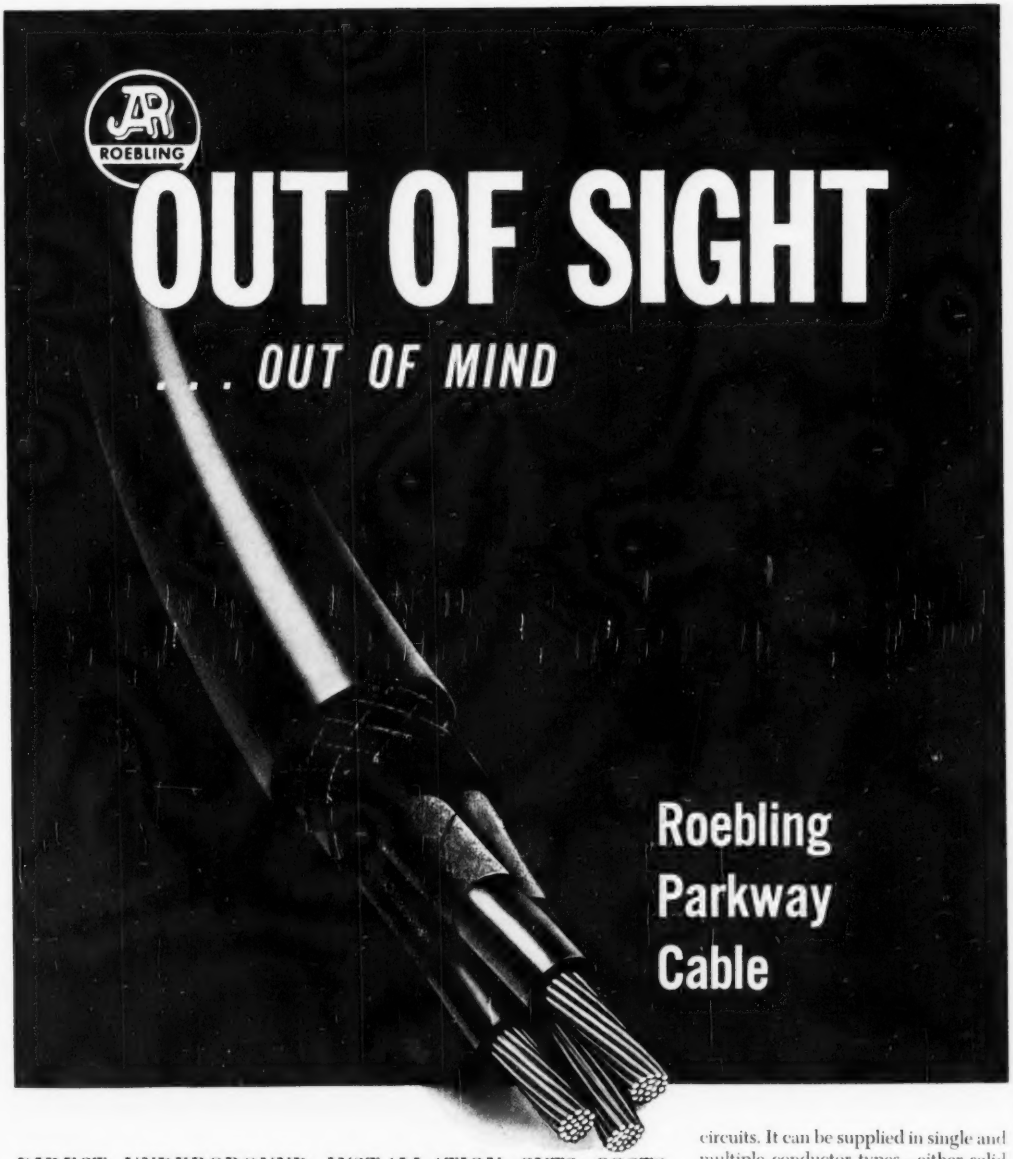
Specify VICTOR for quality and dependable deliveries.

VICTOR
INSULATORS Inc.
VICTOR, NEW YORK



Look for this trade mark of enduring service

V



DIRECT UNDERGROUND INSTALLATION CUTS COSTS

YOU AVOID ALL THE EXPENSE of underground duct systems with Roebling Parkway Cable. It's laid directly in an economical two- or three-foot trench. And as soon as it's out of sight, your problems are over. Wind and weather can't bring service troubles . . . metallic armor or a Roeprene sheath assures safe physical protection.

Roebling Parkway Cable is being widely adopted for series street lighting, parkway boulevard lighting, traffic signal, fire alarm, flood lighting, railroad yard, signal and other types of circuits. It can be supplied in single and multiple conductor types—either solid or stranded—in a range from 600 to 5000 volts.

Have your Roebling distributor or Roebling branch office help select the best cable for your special needs. John A. Roebling's Sons Company of California—San Francisco—Los Angeles—Seattle—Portland.

WRITE OR CALL THE ROEBLING FIELD MAN AT YOUR NEAREST ROEBLING OFFICE AND WAREHOUSE

Atlanta, 934 Avon Ave. ★ ***Boston,*** 51 Sleeper St. ★ ***Chicago,*** 5525 W. Roosevelt Rd. ★ ***Cleveland,*** 701 St. Clair Ave., N. E. ★ ***Denver,*** 1635 17th St. ★ ***Houston,*** 6216 Navigation Blvd. ★ ***Los Angeles,*** 216 S. Alameda St. ★ ***New York,*** 19 Rector St. ★ ***Philadelphia,*** 12 S. 12th St. ★ ***Pittsburgh,*** 855 W. North Ave. ★ ***Portland, Ore.,*** 1032 N. W. 14th Ave. ★ ***San Francisco,*** 1740 17th St. ★ ***Seattle,*** 900 First Ave. So.

ROEBLING

☆ *A CENTURY OF CONFIDENCE* ☆

Now here's a Connector!!!

It's a Servit. We might call it a split-bolt, a "bug" or even a BURNDY. Mister, I call it a *real* connector.

I can't begin to remember how many thousands I've used. One thing sure—they make my job easier.

If I'm making a tap or a service connection just give me a SERVIT and a wrench.

If you're a "Doubting Thomas" try them . . . see for yourself how SERVITS save and serve!

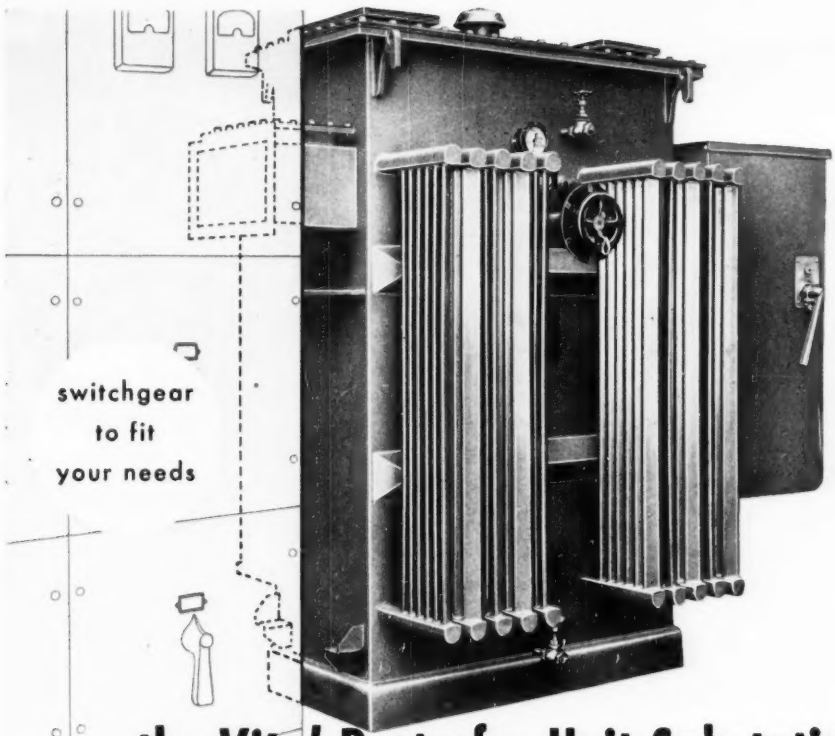
Connect with

BURNDY

New York 54, N. Y.

WESTERN BRANCH: Vernon 11, California

CANADA: Burndy Canada, Ltd., Toronto 8



the *Vital* Part of a Unit Substation is the Transformer

• **Wagner Unit Substation Transformers can be Throat Connected to any make of Switchgear**...The transformer is the vital part—the fuel pump—of a load center distribution system. If the transformer fails, the entire system is dead, whereas only part of the distribution system may be affected by the failure of a switch or circuit breaker.

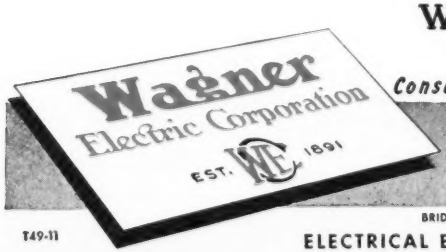
You can be sure of a dependable continuous flow of power from a Wagner transformer and you can be sure that it has been carefully designed to meet your distribution requirements.

Wagner unit substation transformers with incoming high voltage switch sections to meet your requirements, and, with proper throats on the secondary side for connection to any make of switch-gear, are available in the usual range of ratings up to 2000 kva. Our factory-trained sales engineers are well qualified to recommend the various combinations necessary to handle your unit substation requirements and will gladly give you immediate service.

Wagner unit substation transformers are installed in numerous electric generating stations and in all kinds of industrial plants including synthetic rubber, petroleum, steel, chemical, aircraft, automotive, paper, and many others. The importance of the transformer in a unit substation justifies calling in the Wagner sales engineer to help solve all your load center problems.

Our free bulletins TU-13 and TU-56 describe the design and construction features that make Wagner liquid-filled and dry-type unit substation transformers outstanding.

Wagner Electric Corporation
6381 PLYMOUTH AVE., ST. LOUIS 14, MO., U. S. A.



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MADE WITH BRAIDED COTTON SLEEVING BASE

Grade A-1 Magneto Grade Varnished Tubings
Grade B-1 Standard Grade Varnished Tubings
Grades C-1 and C-2 Heavily Coated Saturated Sleevings
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Heavy Wall Varnished Tubings and Saturated Sleevings

MADE WITH BRAIDED GLASS SLEEVING BASE

Grade A-1 Magneto Grade Varnished Glass Tubings
Grade C-1 Extra Heavily Saturated Glass Sleevings
Grade C-2 Heavily Saturated Glass Sleevings
Grade C-3 Lightly Saturated Glass Sleevings
Silicone-Treated Glass Varnished Tubings and Sleevings

FREE TECHNICAL LITERATURE

Send for your free copy of the Dieflex technical folder which describes the different types and grades of Dieflex Varnished Tubings and Saturated Sleevings. Easy-to-read charts help you to select the right tubing or sleeving for your particular application.

SURE, you have to put on the heat for greater productivity with today's more competitive market.

But, you don't have to work harder to turn out more goods—not when you let Dieflex Varnished Tubing Products take the extra load . . and Dieflex will! The secret lies in easier handling, greater flexibility, non-fraying ends. No time is wasted struggling with hard-to-assemble pieces; slow-down causes are eliminated, production is greater...with no increase in effort! And the smooth inside bore of Dieflex prevents snagging, guarantees a rapid, even flow of production.

Arrange now to get test-run samples and prove to your own satisfaction that Dieflex increases production. Contact your nearest Dieflex sales office, today.

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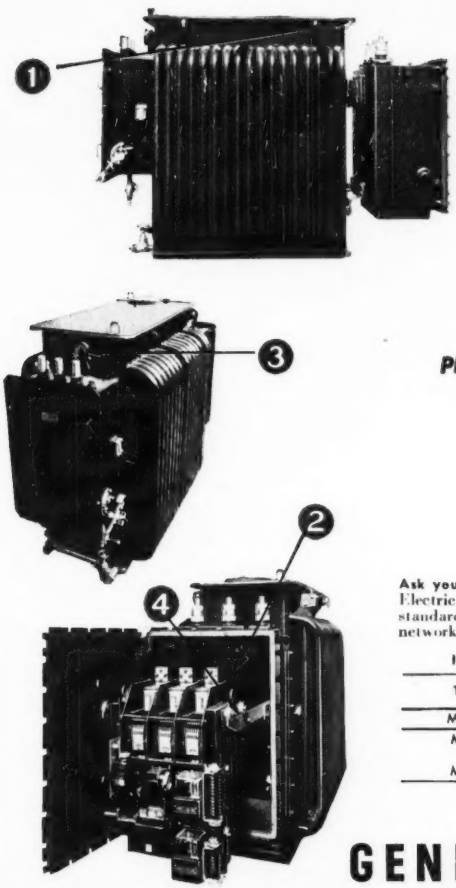
The a-c secondary network system is now recognized as *the* lowest-cost system for providing high-quality service to heavy load areas. While normally used for business sections of cities—50,000 or more in population—it will frequently pay its way in smaller towns as well.

But—to realize the full savings possible with networks, you must use standardized network equipment. For example:

YOU SAVE ON MAINTENANCE when you specify

Standardized Network Equipment



1 MAJOR GASKETS ARE ELIMINATED by welding, not bolting, transformer cover and switchbox to the main unit. Locating the tap changer behind a pipe plug eliminates a packing gland around an external shaft.

2 BUSHINGS can be removed externally, without opening the main transformer tank.

3 ALL TRANSFORMER ACCESSORIES—liquid-level gages, thermometer, tap changer, and all valves—are located at the high-voltage end of the transformer, easy to get to and check.

4 NETWORK PROTECTOR can be slid out on rails for quick inspection. Relays plug in—can be easily removed and replaced for checking.

PLUS **FASTER DELIVERY**—G-E standardized network transformers and protectors can be supplied on shorter delivery.

LOWER PRICE—G-E standardized network units are appreciably lower in price than non-standard designs.

LOWER INSTALLATION COSTS—G-E standardized network units are designed for narrower, shallower vaults, saving substantially in vault-construction costs.

Ask your G-E representative or write to Apparatus Dept., General Electric Company, Schenectady 5, N. Y. for full information on standardized network equipment. Bulletin GEA-5024 describes network transformers; GEA-2017, network protectors.

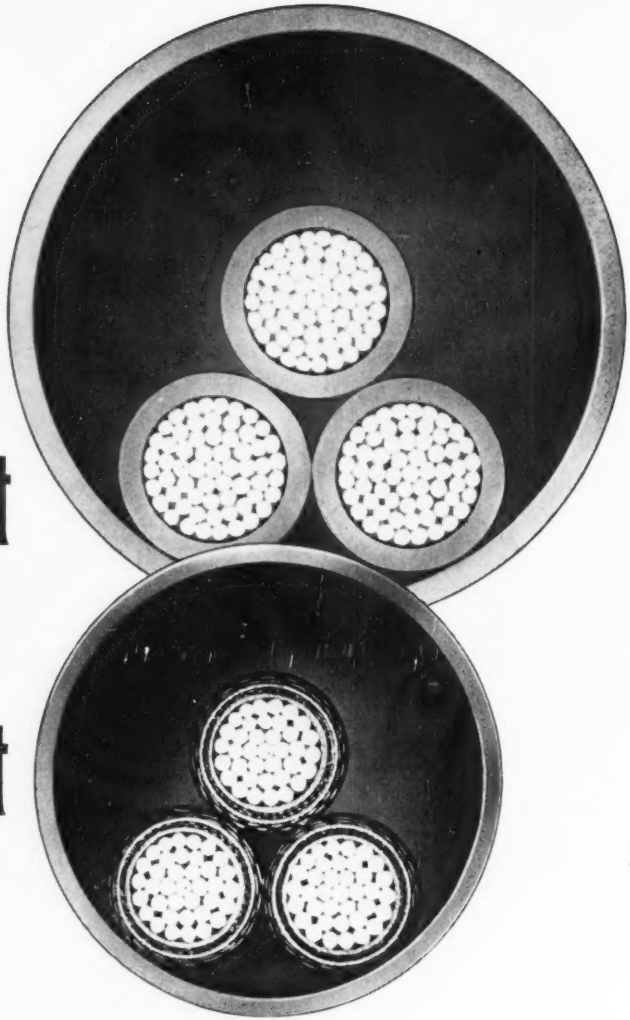
INCREASED Interrupting Ratings on Network Protectors

Type	Continuous Rating in Amperes	Interrupting Rating in Max. R.M.S. Amperes
MG-13	200 to 600	20,000
MG-8	800, 1200, 1600	30,000
or	2000	35,000
MG-9	2500 and 3000	60,000

GENERAL ELECTRIC

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities

Why Buy 4" Conduit when 3" Conduit will do?



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To save money specify *permanently-insulated* Rockbestos A.V.C. Write for the booklet "The Story of An Insulation."

*Comparison made with Type RH based on Chapter X, National Electrical Code, 40°C-104°F Ambient

ROCKBESTOS A.V.C.

ROCKBESTOS PRODUCTS CORPORATION, NEW HAVEN 4, CONN.

OFFICE AND WAREHOUSE, OAKLAND MUNICIPAL AIRPORT, OAKLAND, CAL.; LOS ANGELES DISTRICT OFFICE, 6919 SAN FERNANDO RD., GLENDALE, CAL.

A HOLIDAY MEMORY...

Time was when Christmas trees were lighted with wax or tallow candles. It took time to put them on the tree . . . each had to be painstakingly located to assure safety against fire. They had to be lighted one at a time . . . and so carefully, too!

Today . . . the candle on the tree is but a holiday memory. In thousands upon thousands of homes the Christmas tree is adorned in colorful array at the mere flick of a switch . . . an accomplishment made possible by modern electric distribution systems.

G & W has pioneered in the development and manufacture of many devices for safe, economical electric distribution . . . devices that are in service all over the nation, helping contribute to happy holiday enjoyment. And while G & W devices in service are contributing to Christmas enjoyment, we at G & W wish all of our friends and associates in the industry a joyous holiday season.

G&W ELECTRIC SPECIALTY CO.
7780 DANTE AVENUE • CHICAGO 19, ILLINOIS

Johns-Manville Announces Two New

Smooth layers of Quinterra Type 6 Electrical Insulation ***(Twin-ply)****, used in winding a Marcus dry-type transformer*

Quinterra

TYPE 6 (TWIN-PLY)

A new cost-reducing, high-temperature insulation that prolongs transformer life many times through its resistance to pyrolysis

Here is a radically new asbestos-base, continuous-sheet, paper-like electrical insulation that offers many economies. It is primarily intended for interlayer and wrapper insulation in windings and coils used in Class A and B transformers (internal hot-spot temperatures 130C, or higher if special varnishes are employed).

Quinterra Type 6 is plied at the factory by welding two layers of Quinterra and calendering them into a dense, strong and smooth-surfaced insulation having good tensile and bursting strengths. For economical application with a minimum of waste, Quinterra Type 6 is furnished in continuous rolls cut to exact widths.

Excellent handling properties

Uniformity of physical and handling properties enables assemblers to achieve production rates such as are attained with the best types of interlayer and wrapper insulations. Further economies result from the large square-foot-per-dollar coverage.

Excellent constructional advantages

The plied construction of Quinterra Type 6 offers two distinct constructional advantages: (1) It provides better dielectric protection than a single layer. (2) Under stress, the weaving strains within coil structures are less likely to damage a plied insulation than a single-layer insulation.

Excellent dielectric-thermal characteristics

The base sheets of all Quinterra products are made 100% inorganic, but, for mechanical reasons only, are saturated with an organic resin. At room temperature (ASTM conditions) Quinterra Type 6 averages in excess of 350 VPM. After prolonged exposure at 175C, long after the thermoplastic saturant is driven off, it still maintains its original dielectric strength and requires only the re-establishment of its varnish protection to provide a further useful life cycle.

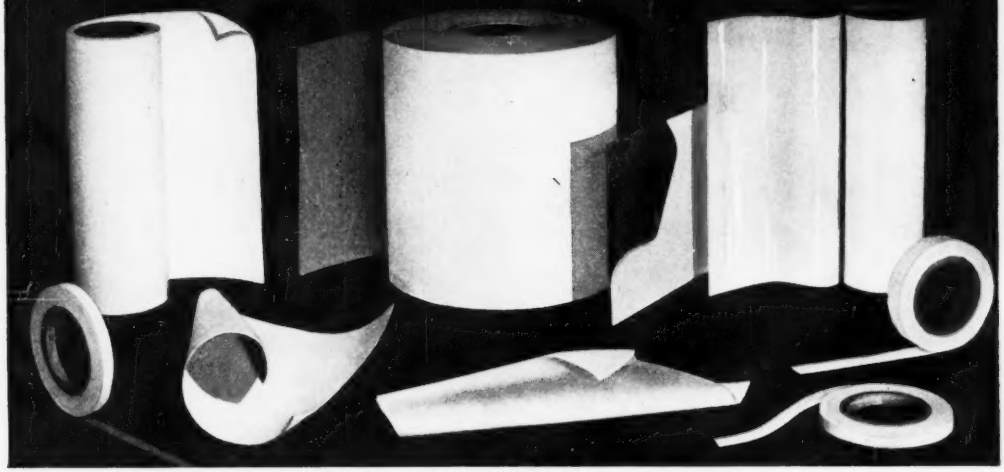
We will be glad to provide you with samples and further information about Quinterra Type 6 Electrical Insulation. Write Johns-Manville, Box 290, New York 16, N. Y.

Weights and thicknesses of Quinterra Type 6

Thickness ± 10%	Weight Per 100 sq ft ± 15%	Approx Coverage sq ft lb
.0045"	2.5	40
.006"	3.3	33
.007"	3.8	26
.008"	4.5	22
.009"	4.8	20
.010"	5.5	18
.012"	6.2	16
.015"	7.2	14

Johns-Manville

Asbestos-Base Electrical Insulations



A variety of types of electrical insulations as produced by combining glass, mica, and organic papers and films with Quinorgo #3000 or #4000.

Quinorgo

#3000 AND #4000

New, economical, high-temperature insulations with a previously unattainable combination of dielectric and mechanical properties

Quinorgo #3000 and Quinorgo #4000 are two new insulations developed by Johns-Manville. Each can be used alone or in combination with other dielectrics. In the latter use they can be either treated or coated with insulating varnishes, or combined with organic or inorganic electrical insulating sheets or films.

Quinorgo insulations contain 80% or more of specially processed asbestos fiber, the remainder being selected organic fibers and binders. The two types differ in that the organic portion of Quinorgo #4000 contains a small amount (3% or less) of resin not present in Quinorgo #3000. The resin slightly reduces absorption and penetration.

These highly improved forms of asbestos electrical insulations have extreme uniformity of texture and caliper (from .005" to .015"). They are furnished in continuous rolls, in tapes of exact widths and in sheets cut to size.

Excellent for compactness — Quinorgo #3000 and #4000 have important advantages where asbestos papers previously could not be used because they were too thick, their dielectric too low, or strength inadequate.

Excellent for "composites" — Quinorgo #4000, because of its heat resistance, closed nonwoven structure, uniform thickness and special penetration characteristics, is ideal for use in composite insulations.

For example, it may be coated on one surface with shellac or varnish to permit bonding or cementing to it such mechanically or dielectrically stronger materials as inorganic woven cloths and mica or organic cellulose films or sheets. The opposite surface remains ready for absorption of treating varnishes used in the further processing of equipment after the composite insulation has been applied.

Excellent for economies—Quinorgo #3000 and #4000 may be economically substituted for quality grade organic or inorganic layer insulation. When varnish-protected in apparatus, they will perform indefinitely because of their high asbestos content. (Hot-spot temperatures to 130C).

We will be glad to provide you with samples and further information about Quinorgo insulations. Write Johns-Manville, Box 290, New York 16, N. Y.

General average properties of Quinorgo #3000 and #4000

Thickness	Lbs Per 100 sq ft		1" wide Longitude T.S. lbs		Dielec Min VPM
	3000	4000	3000	4000	3000-4000
.005"	1.5	1.7	14	15	300
.007"	2.2	2.5	18	19	300
.010"	3.3	4.0	20	21	250
.015"	4.7	5.7	26	28	200

Electrical Insulations

JOHNS MANVILLE JM PRODUCTS

CERTIFIED BALLASTS

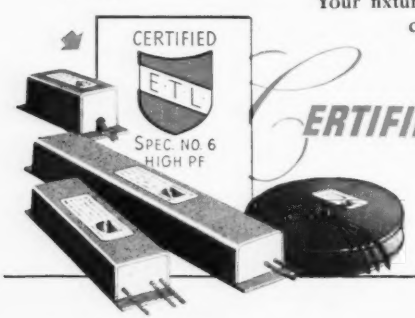
● Do customers complain that fluorescent tubes in your fixtures seem to burn out too soon? Perhaps the trouble lies in the ballast that operates them.

One of the advantages of CERTIFIED BALLASTS is that they assure *Full Lamp Life.* Leading fluorescent tube manufacturers recognize that CERTIFIED BALLASTS in a fixture are evidence that full rated tube life should result.

Other worthwhile advantages of CERTIFIED BALLASTS include: *Rated Light Output* and *Long Dependable Performance.*

CERTIFIED BALLASTS are made to exacting specifications, then tested and certified by Electrical Testing Laboratories, Inc., an impartial authority, to assure best operation of tubes and ballasts.

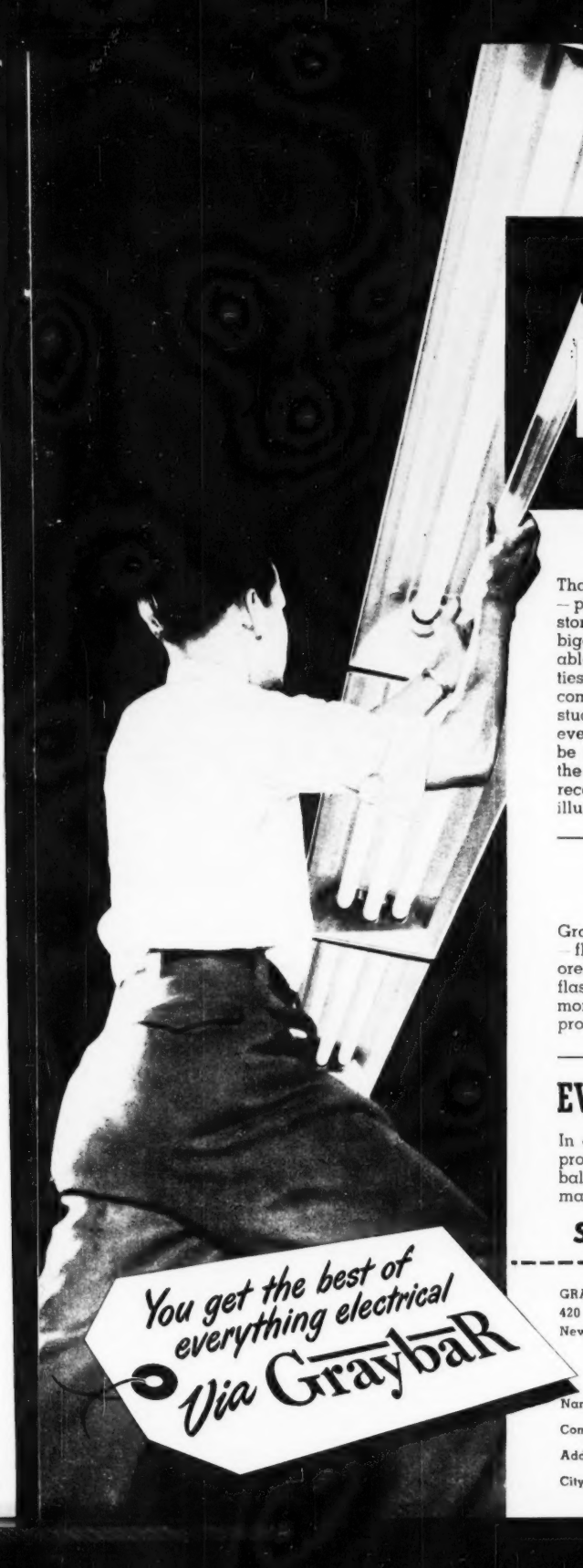
Your fixtures sell more readily—give greater customer satisfaction—when they are equipped with CERTIFIED BALLASTS.



CERTIFIED BALLAST MANUFACTURERS

Makers of Certified Ballasts for Fluorescent Lighting

2116 KEITH BLDG., CLEVELAND 15, OHIO



You're sure it's the

RIGHT LIGHT

...if it's "via Graybar"!

That's true whether the light is for street or highway – plant or yard – play area, manufacturing plant, store, office, home . . . or product. For Graybar has the biggest selection of lamps and lighting units available anywhere. And Graybar – working with utilities, electrical contractors, and operators of industrial, commercial, and institutional establishments – has studied, planned, and supplied lighting systems of every type. Thus a Graybar Lighting Specialist can be of great assistance to you or your customers in the planning of any lighting – indoors or out. He can recommend impartially the best equipment for any illumination need.

Local Stocks of Lamps

Graybar distributes all types and sizes of G-E lamps – fluorescent, filament, mercury – clear, frosted, colored – glow lamps, heat lamps, germicidal lamps, flashlight lamps. Stocks are maintained at Graybar's more than 100 warehouses throughout the nation for prompt delivery anywhere.

EVERYTHING FOR LIGHTING

In addition to the fixtures and lamps, Graybar can provide all the proper wire, conduit, switches, and ballasts. All are first-quality products of leading manufacturers.

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You get the best of everything electrical Via Graybar

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Please send me free a copy of your 84-page book, "Planned Commercial Lighting".

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TROUBLE

...Which can be avoided

STOP POLE DECAY...

with OSMOPLASTIC groundline treatment

● Rain, a sudden dropping, zero-bound thermometer and then snow. A whirling, swirling, blinding mass of white that completely immobilizes operations. Tons of ice form on lines... and the "sticks" start coming down.

That's a condition every utilities man knows and dreads. It not only impairs service and causes untold hardships to subscribers but it *skyrockets operating costs.* Yet...in many cases, it can be prevented with Osmoplastic groundline treatment. Osmoplastic is a concentration of toxic salts, suspended in a coal tar body. When applied to the groundline area of the pole and covered with a special "bandage", the salts penetrate DEEP into the pole, destroying all fungi and preventing further decay for years to come. Employed by prominent utility companies everywhere, Osmoplastic is the simple, inexpensive but effective way to add EXTRA life to all your standing poles.

Let us submit estimates and explain how *our experienced field crews can handle this work for you* at surprisingly low cost. Or, if you prefer, we will supply the materials for your own application.

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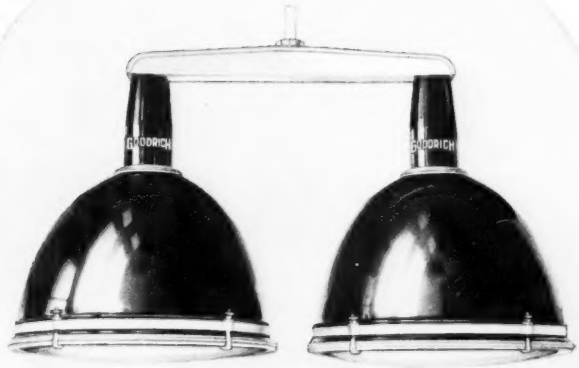
FREE BOOKLET

Get the facts! Find out how you can save your standing poles for a nominal service charge. Write for this free booklet "How to keep your Poles UP and Costs DOWN!"

DAN KAMPHAUSEN COMPANY, Continental Oil Building, Denver, Colorado

where there's profitable production

there's good light!



This Twin High-Bay Mounting Fixture is typical of the hundreds of types and sizes of Appleton Lighting Fixtures.

APPLETON LIGHTING EQUIPMENT

The Appleton Type EFU Explosion-Proof Fluorescent Lighting Fixture, first of its kind ever to be developed. Appleton Explosion-Proof Lighting Fixtures include types and combinations to meet the requirements of all hazardous locations in industry.

WHEN YOU PLAN industrial lighting with Appleton equipment the result is a finely coordinated system that paves the way for top worker efficiency and better production. That's because Appleton fixtures are scientifically designed to provide proper illumination for any given working area, whether indoors or out.

The manufacture of Appleton Lighting Equipment is quality controlled from drawing board to final delivery. Reflectors are made of pure ingot iron, finished with vitreous-fired porcelain enamel for rugged weather resistance. Appleton sectionalized construction assures easy, economical installation, quick convenient servicing.

Whatever your lighting requirements, there's an Appleton Fixture that exactly suits the purpose. For better lighting that spells better production, specify Appleton—STANDARD FOR BETTER LIGHTING.

Write for complete catalog information

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YOU CAN BE SURE.. IF IT'S

Westinghouse

"Good neighbor"—good worker

The Westinghouse CSP Power Transformer has important new features:

Type TRO Thermal Relay that automatically integrates time with oil and copper temperature for accurate thermal control; fully accessible without breaking transformer seal.

Simplified URS Underload Tap Changer for reliable regulation and less maintenance.

Multi-Orifice "De-ion" Protective Link with extra-high interrupting capacity; easily replaced.

Mechanical Relief Device for dependable relief of internal pressures.

Standard Flexitest Control and Metering Instruments mounted on swinging panel.

Standard Plastic-Filled Control and Metering Transformers in air compartment.

Plus time-proved *Sealedaire Construction* for preservation of oil and insulation.

Substations can be "Good Neighbors"

Westinghouse CSP® Power Transformers can help you solve your substation real estate problems.

Small . . . trim . . . friendly in appearance . . . the Westinghouse Completely Self-Protecting Power Transformer has proved to be a "good neighbor" in even the best of neighborhoods. No longer is it necessary to have masses of steel, regulators, arresters, breakers, meters, fuses and other separate equipment of the open-type substation . . . because the CSP is a self-contained, single-feeder substation that occupies less than a third of the space required for old-fashioned structures . . . and can be landscaped into unobtrusive settings.

While you're securing substation sites in residential areas with the CSP . . . earning plenty of good will . . . this packaged Westinghouse unit delivers these additional advantages:

Simplifies Purchasing — Only one piece of equipment instead of many.

Cuts Installation Time and Expense — Move into position and connect. Steel work is not needed. Your substation can begin service right away.

Completely Self-Protecting—(CSP)—Factory-co-ordinated protection of all components against lightning, short circuits and overloads.

Can Be Moved Easily if the center of load changes.

More than 500 of these architecturally designed Westinghouse CSP Power Transformers—handling over 800,000 kva—have been installed and put into operation since they were introduced in 1936. Westinghouse Unit Substations offer similar advantages for multi-feeder service. To get complete information, call your Westinghouse office, or write Westinghouse Electric Corporation, Transformer Division, Sharon, Pennsylvania.

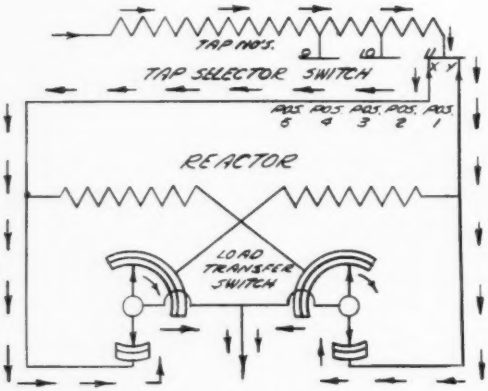
J-70547

Westinghouse "CSP"

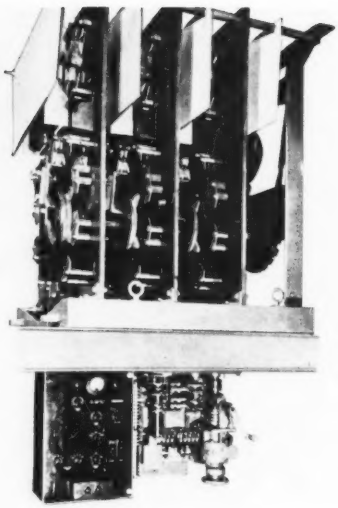
POWER TRANSFORMERS

SINGLE-FEEDER UNIT SUBSTATIONS

PRODUCT NEWS



How bypassing is accomplished. Copper loss of switching reactor is eliminated on 17 of 33 operation positions



Load Tap Changer Incorporates New Principles

(1200) Moloney Electric Co., St. Louis, Mo.

Moloney Electric Co., St. Louis, has announced its entry into the tap-changing-under-load field with a line of load tap changers and automatic control equipment. New principles of operation and improvements in design and operation are incorporated. Initially this new type MA load tap changer line will include medium- and large-size 3-phase automatic step voltage regulators, regulating transformers and load ratio control power transformers of all sizes and ratings. Standard Moloney tap changers are arranged to provide a voltage regulation range of 20% in thirty-two $\frac{5}{8}$% steps.

Features of this new load tap changer include: (1) A new principle of reactor switching. (2) Elimination of arcing duty from the tap selector switch. (3) Increased tap changer interrupting capacity. (4) Application of new contact and insulating materials. (5) Combined spring-accelerated and direct-drive load switching.

Illustrated is a 34.5-kv. load tap changer mechanism now in production for 10% plus or minus regulation on transformer ratings up to 35,000 kva. 15-kv. mechanisms are also in production. Both are equipped with load transfer switches, which serve the dual purpose of relieving the tap selector switch of all arcing duty, and of switching the preventive autotransformer or switching reactor in and out of the circuit. The load transfer and tap selector switches are actuated through two sets of intermittent gear drives, interlocked mechanically through spur gears to a common motor drive. The "alternate-intermittent" operating principle using gears of the Geneva type results in definite relative timing of the two switches and of a reversing switch, and also results in accurate placement of all current-carrying parts.

The load transfer switch operation is such that on half of the tap changer operating positions the switching reactor is bypassed and its loss and voltage drop eliminated. This applies to transformers and regulators designed for 32-step regulation. When regulation in only 16 steps is required, there is no reactor loss or drop in any operating position.

Load current is not broken on the selector switch. The load transfer switch shifts the load current from one circuit in series with one tap selector contact to another parallel path, following which the tap selector switch, thus relieved of current-carrying duty, is moved to the next operating position. This step is followed immediately by a reclosure of the load transfer switch which completes the circuit for the flow of current from the advance tap.

Only twelve stationary contacts are subjected to arc erosion; whereas, the majority of machines in service impose arcing duty upon a total of 54 contacts in a 3-phase machine capable of operating over a similar number of transformer taps.

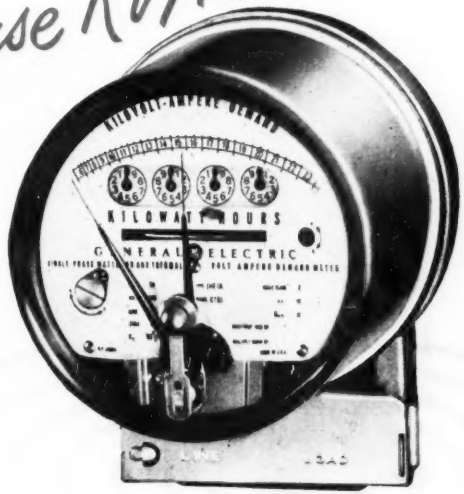
Replacement of contacts, necessitated by mechanical erosion, has been greatly reduced with little reduction in conductivity through proper selection of the newest hard copper alloys.

Quick make and break of the load transfer switches is accomplished through use of accelerating springs. In event of spring failure, however, the mechanism operates as a directly driven unit.

A complete line of remote-manual and fully automatic controls has been developed. Included are limit and positioning switches and all other devices and features normally available on such apparatus. The automatic control equipment features a super-sensitive voltage regulating relay and a glow-tube capacitor time delay circuit.

GENERAL ELECTRIC ANNOUNCES

a new device for direct measurement of Single-phase KVA demand



TYPE IHE

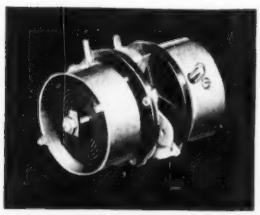
WATTHOUR

THERMAL

KVA

DEMAND

METER



This conventional bi-metallic thermal element is coupled in a unique way with a "resistance valve" to give a true measure of kva. See explanation in text at right.

You can now measure single-phase kva demand easily and economically with this new G-E meter.

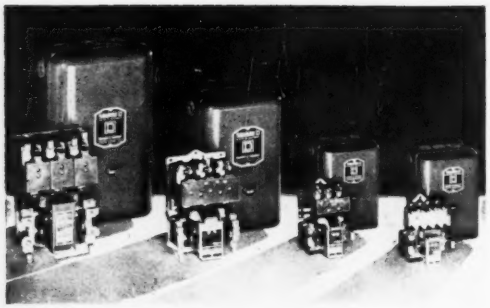
A NOVEL APPLICATION of the *"direct-heat"* current-energized thermal element has made this possible. A resistor (controlled thermally by voltage) has been inserted in series with the negative torque spiral of the thermal element. Torque of the element, therefore, varies directly with line voltage as well as current. Since the torque of the thermal element is caused by the current and by the heating effect of the line voltage, operation of the meter is independent of phase relation (power factor). Thus it gives a true measure of kva.

OTHER DESIRABLE FEATURES of the IHE include a wide-limit watthour meter element. It is equally accurate at high and low loads. It has braking magnets die-cast in the frame for calibration stability. And, it has a relief gap that provides a controlled breakdown point.

Load curves, response times, thermal ratings, and other details are available in Bulletin GEC-504. Your nearest G-E representative will be glad to give you a copy. Or you can write to *Apparatus Department, General Electric Company, Schenectady 5, N. Y.*

GENERAL ELECTRIC

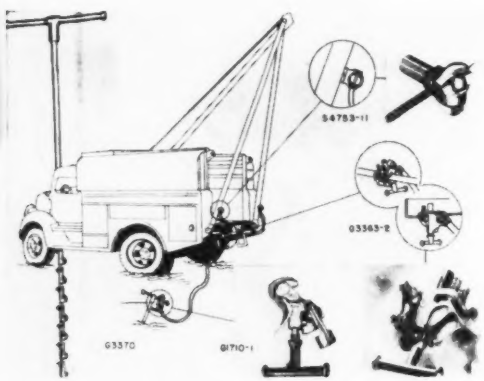
With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.



A-C Starters and Contactors

(1201) Square D Co., Industrial Controller Division, 4041 N. Richards St., Milwaukee 12, Wis.

In this new line, standardized wiring and mounting dimensions have been adopted to simplify engineering, installation and maintenance of machine controls. Sizes 0, 1 and 2 open-type contactors and starters are made with NEMA standard mounting dimensions; holding circuit interlocks are on left of the verticle centerline, as specified by NEMA for size 3 and smaller. NEMA standardized control and power wiring is furnished with all sizes of contactors and starters. Design features on size 0 through size 3 include straight-line guided motion of armature and movable contact assembly. Double-break, silver-to-silver contacts are readily accessible for inspection and replacement without removing wiring. Design permits quick coil removal with screw driver. Further information in the company's bulletin 8536.



Truck Ground Set for Safety

(1202) A. B. Chance Co., Centralia, Mo.

For protection of ground crews, this new safety device is designed to ground trucks and construction equipment in use near substations and high-voltage lines. It grounds the truck bed to a screw ground rod installed near the job and attached to the truck by a long flexible cable. The truck boom is bonded to the bed by two short lengths of cable secured with special clamps. Thus, any current contacting the boom will be grounded through the truck grounding set. Set consists of four grounding terminals with two 18-in. sections of cable attached, 30 ft. of No. 2 extra flexible rubber-covered cable, two tap clamps and a 6-ft. screw ground rod. Ground may be made to substation ground, water pipe, or transmission tower.

New Panelboard

(1203) Trumbull Electric Mfg. Co., Plainville, Conn.

Designed for group and branch circuit control of lighting distribution for industrial and commercial applications, the new NTPR is announced as a low-cost panelboard. It has a hot-molded phenolic section with six complete circuits made with quality parts which, the manufacturer

claims, are generally found only on higher priced panelboards. This section comes in 6 to 42 circuits; is Underwriters' approved. The panelboard was designed to fit standard stud walls without projections. Spacious wiring gutters and various sized knockouts have been provided for all kinds of wiring arrangements. Current-carrying parts are silver finished; plug fuse receptacles will accommodate non-tamperable fuses.

Capacitor Switch

(1204) General Electric Co., Schenectady 5, N. Y.

Designed to replace more expensive switching devices, this capacitor switch is rated 15,000 volts, 100 amp. continuous, 3 phase. It is oil immersed, electrically operated and constructed for outdoor use. According to the manufacturer, it is intended to encourage capacitor installations on high-voltage circuits. Primarily for pole mounting, the switch can be supplied as a component part of housed capacitor equipments. It is capable of switching its continuous current at 15,000 volts.

Multi-Use Bend Sections

(1205) Orangeburg Mfg. Co. Inc., Orangeburg, N.Y.

For flexibility in field installations, these bends are made from short lengths of straight Orangeburg conduit with offset male and female joints tooled at an angle of $2\frac{1}{2}$° resulting in a bend section of 5°. Available for the manufacturer's standard conduit diameters of 2, 3, 4, $4\frac{1}{2}$, 5 and 6 in.

The C A A approved cables for Airport Wiring

Single and multiple conductor for 600, 3000 and 5000 volt service. Write for descriptive specifications RR-1 and RO-4.

RoMarine - RoPrene and RoZone - RoPrene

Close to a billion dollars will be spent on a national airport building and improvement program . . . a whale of a market for electrical wholesalers and contractors. When it comes to airport wiring be sure you specify RoMarine-RoPrene or RoZone-RoPrene. These Rome cables are the first to be approved by the Civil Aeronautics Administration for airport lighting and control circuits.

RoMarine-RoPrene is approved as Type A—Style RR for 600, 3000 and 5000 volts. RoZone-RoPrene is approved as Type B—Style ROR for 3000 and 5000 volt service. The approval covers single and multiple conductor constructions in all sizes described by Specification L-824.

In being the first cable manufacturer to receive CAA approval, Rome Cable is well prepared to take care of your requirements promptly. Contact your nearest Rome Cable office for price and delivery.

It costs less to buy the best . . . buy Rome Cable

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ROME • NEW YORK
From Bar to Finished Wire

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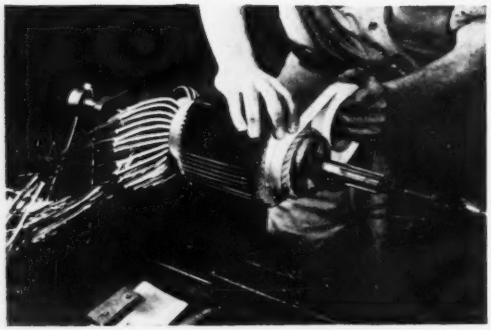
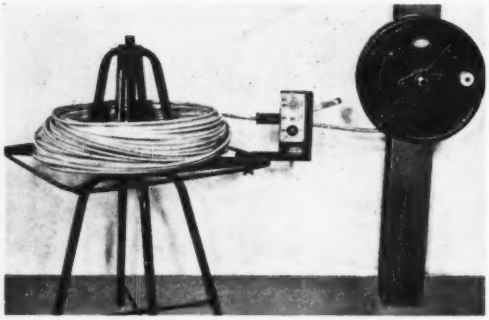
2038 Bay Street

SAN FRANCISCO 3, CALIF.
1045 Bryant Street

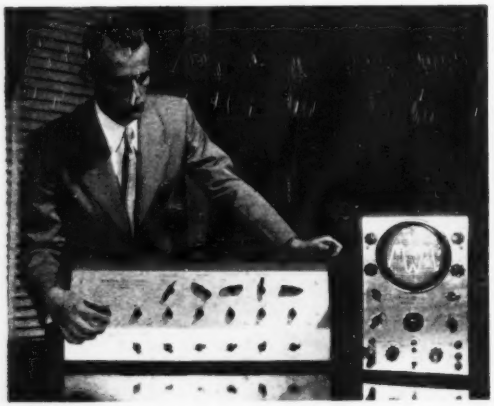
SEATTLE 4, WASH.
3404 Fourth Ave., So.



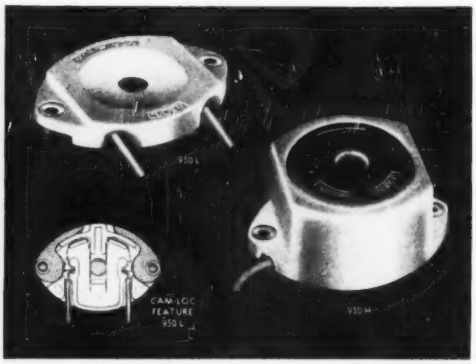
(1206) An electrical tape claimed to stand temperatures up to 300° F., Scotch brand tape No. 27 is used without other insulating materials. It has a fireproof glass cloth backing and a thermosetting adhesive that sets at 250° F. in two hours, or 300° F. in one hour. It contains no sulphur. The glass cloth is unaffected by moisture and has a tensile strength of 150 lb. per inch of width. Made by Minnesota Mining & Mfg. Co., 900 Fauquier St., St. Paul 6, Minn.



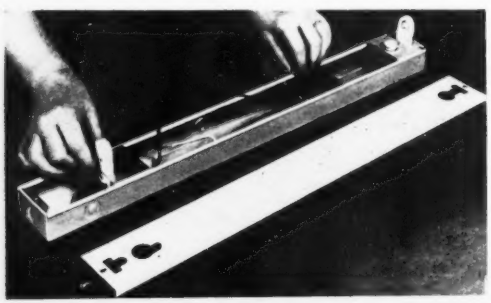
(1208) This wire measuring unit consists of a storeroom reel stand, an 18-in. individual reel and a HyKon wire measuring device. The meter, said to be built for long life, is also available separately. Wire and cable sizes to 1 in. diameter can be accurately measured and registered up to 1,000 ft., the manufacturer states, and can be unrolled and recoiled without kinks or knots. This measuring device is a product of HyKon Manufacturing Co., Alliance, Ohio



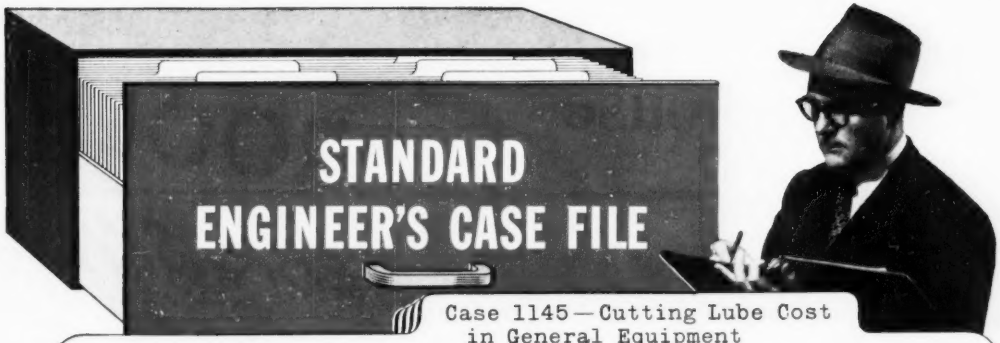
(1207) This harmonic generator is for use in instructing science and engineering students in the theories of wave formation. With outputs of a fundamental voltage and five harmonic voltages, the new device gives a visual image on an oscilloscope screen of virtually any wave shape needed in a given engineering problem. Available from General Electric Co., Special Products Div., Schenectady 5, N. Y.



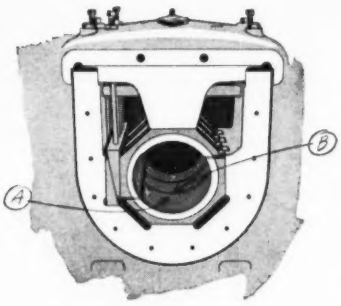
(1209) New slimline lampholders are shorter; are claimed to permit fixture manufacturers to save at least 1½ in. of steel on each fixture. The low-voltage end has the patented Cam-Loc feature for quick assembly. These holders will accommodate slimline tubes from T-6, ¾-in. size to T-12, 1½-in. size; can be mounted in ⅜-in. over-all wireway. They are designed for easy, and foolproof lamp insertion. Made by Lloyd Products Co., 225 Chapman St., Providence, R. I.; catalog 950L and 950H, white or black plastic



(1210) Small size and a sliding socket rack are features of this new strip light. The sliding socket rack, which makes the channel a complete unit without cover, was provided for ease of installation and service. Whether mounting is end to end, or connections are made from either side, socket can be slid out of the way; after installation, fixtures can be tested before covers are attached. Connection to fixture may be made from any side except cover. Knockouts on both sides are provided for cord and plug and switch mounting. Recessed ballast holes permit mounting on flat surfaces without rocking on screw heads. Manufactured in high and low power factor models taking 15-, 20-, 30- or 40-watt lamps, wired ready to mount, this Strip-Lite is available from the Gibson Mfg. Co., Atlanta, Ga.



Case 1145—Cutting Lube Cost in General Equipment



AIR COMPRESSOR MAIN BEARING

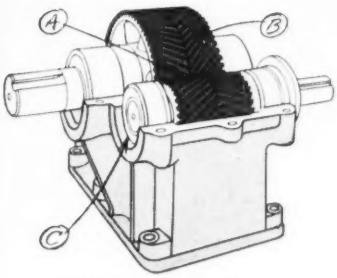
Calol Multi-Service Oils in air compressors decreased lubricant consumption as much as 20%. Highly efficient in many machines, including Diesel engines, pumps, enclosed reduction gears and their integral bearings. Come in six grades: 45X, 50X, 55X, 65X, 75X, 85X. Approximately SAE 10 to SAE 50.

A. Contain oxidation-resistant compounds ... prevent formation of varnish and lacquer on bearing surfaces, engine cylinders, pistons, etc.

B. Special compound assures lubrication at high temperatures — has inherent tendency to "run toward" hot surfaces ... spreads uniformly and rapidly.

Other additives in Calol Multi-Service Oils help remove lacquer and varnish from machine parts and keep them dispersed, and prevent excessive foaming of oil. May be used in all types of oiling systems.

Case 1143—Preventing Scuffing and Galling of Enclosed Gears



ENCLOSED REDUCTION GEAR

The teeth of industrial enclosed reduction gears, lubricated with Calol Gear Compound, remained in good condition even when operating under the heaviest shock loads. Calol Gear Compound is recommended for both single and double enclosed reduction gears where load conditions are severe. Comes in 8 grades to meet a wide range of conditions: Nos. 60, 100, 120, 135, 150, 190, 225, and 410. (Numbers designate viscosities at 210° F.)

A. Contains extreme pressure compounds — will not pound or squeeze off . . . reduces wear, cushions shocks and promotes gear efficiency.

B. Resists oxidation, conducts heat readily and helps cool gears, bearings, etc.

C. Foam inhibitor prevents building up of pressure in gear cases and reduces leakage.

Trademark Reg. U. S. Pat. Office

STANDARD TECHNICAL SERVICE will make your maintenance job easier. If you have a lubrication or fuel problem, your Standard Fuel and Lubricant Engineer or Representative will gladly give you expert help: or write Standard of California, 225 Bush St., San Francisco 20, California.

CALOL

FOR EVERY NEED A **STANDARD OF CALIFORNIA** JOB-PROVED PRODUCT

YOU CAN BE SURE.. IF IT'S
Westinghouse

PROOF
FROM
NEBRASKA

"'CSP' saved us $17,465.50 in our urban radial system"

So said this midwestern operator after installing 650 Completely Self-Protecting distribution transformers.

When the 2,400-volt radial feeders for urban and suburban areas outside the downtown network system became seriously overloaded, distribution voltages were stepped up to 7,960/13,800 volts wye.

Economically, the utility found this comparison of costs *beyond the price of the basic transformer:*

FOR CONVENTIONAL INSTALLATION		FOR "CSP"* INSTALLATION	
Arrester, installed	$30.00	Additional cost of "CSP" over the conventional transformer—includes built-in lightning and thermal protection plus load indicating light.	$34.13
Fuse mounting and fuse, installed	20.00		
Two 8 ft. crossarms, installed	12.00		
3 ft. crossarm, installed	4.00	Higher pole for secondary lead clearances	5.00
Total	$66.00	Total	$39.13

Simple arithmetic makes 650 "CSP" installations save $17,465.50. What's more, *real* protection from overload was secured—with semiautomatic load check as a bonus. Conventional transformers with fuse links could not supply this protection and still withstand lightning surges.

One thing you can be sure of: the built-in protection of "CSP" saves installation costs. Westinghouse Electric Corporation, P. O. Box 868, Pittsburgh 30, Pennsylvania.

J-70526

**Trademark—Reg. U. S. Pat. Off.*

HERE'S PROOF FROM U. S. A.—Thirty case histories of Completely Self-Protecting transformers, with names, dates, places, facts and figures. Get your copy of B-4248.

Call the Westinghouse Salesman

Westinghouse "CSP" TRANSFORMERS

Made in the WEST.. for the WEST

TREAT YOUR
MOTORS
as carefully
AS YOU DO YOUR
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"OHIO"
BRUSHES GIVE
MAXIMUM
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"MOTOR MILEAGE" means substantial savings in time, labor and money! Efficient and well designed "OHIO" motor brushes are the key to long lasting motor performance. Our plant handles the raw material from the blue-print to the finished product. For specially designed brushes and carbon specialties, send us your requirements. Our experienced engineering staff will aid you with many saving suggestions.

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Switchboard Watt-Hour Meters

(1211) Sangamo Electric Co., Springfield, Ill.

This new line of switchboard single-phase and polyphase watt-hour meters is designed for semi-flush mounting. Type LCF, for polyphase circuits, and type JF, for single-phase circuits, are offered in all current and voltage ratings for which standard service-type watt-hour meters are made. They are available either with kwh. registers or with registers measuring both kwh. and kw.

The mounting enclosure fits a 6⅜ x 6⅜-in. opening in the panel; cover is removable; stud-type terminals are provided for back connection. Adjustments for full load, light load, power factor and element balance are accessible from the front without removing meter from panel. A micrometer slidewire device is provided for making power factor adjustments.

Connectors

(1212) W. N. Matthews Corp., 3850 Delor St., St. Louis 16, Mo.

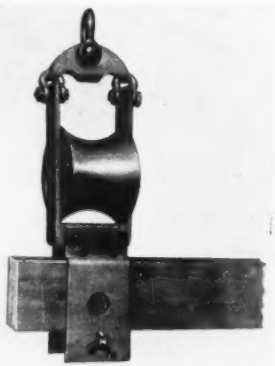
A new slotted-bolt connector is cold forged of 99.6% conductivity electrolytic copper. Known as 10NU, it supersedes a machined connector, manufactured from a 17% conductivity bronze. It has a slotted width of 0.117 in., an effective slot depth of 0.281 in. and a thread diameter of 5/16 in. (0.3125). Its application is for making copper-to-copper connections with copper or conductor sizes up to and including No. 10. The manufacturer claims that, since the new connector is made of copper having the same electrical and physical characteristics as the conductor, a connection of high conductivity and low resistivity is maintained.

Box Hanger

(1213) Tomic Sales & Engineering Co., 4864 Woodward Ave., Detroit, Mich.

With this two-in-one box and fixture hanger, it is claimed that an electrician can lock the box in the concrete form

in the exact position required and keep it there until the pour is completed. It is stated that, except for the centering clamp, the hanger may be used again and again.



Stringing Dollies

(1214) Distribution & High Line Specialties Co., 2100 Del Norte, St. Louis 17, Mo.

For aerial cables, large power conductors, signal and control and communication cables, these dollies can be mounted on top of crossarms in either horizontal or angle construction, in vertical or horizontal position; may be suspended below arm or other fastening, chain mounted direct to pole for large angles, attached to pole on combination support bracket by chain tightener in either upright open-yoke position or flexibly suspended.

They come with groove openings 2½, 4½ or 5½ in. wide and pulley diameters at bottom of groove 4½ or 10½ in. They are said to fasten rigidly to 3½x4½, 3¾x4¾, 4x5-in. crossarms.

CRESCENT
SYNTHOL BUILDING WIRES

TYPE TW
For Both Wet and Dry Locations

FOR BETTER WIRING

Simplify Your Stock Problem

USE THIS ONE TYPE FOR ALL YOUR BRANCH CIRCUIT REQUIREMENTS

CRESCENT SYNTHOL —Type TW, Building Wires and Cables are insulated with a special, tough, thermoplastic compound that results in wires of unexcelled Permanence, Safety, Adaptability and Value. They combine high dielectric and mechanical strength with the following desirable features.

SMALL DIAMETER —has smallest outside diameter for same conductor size, permitting more conductors, or larger conductors in same space.

FLAME RETARDING —SYNTHOL insulation will not support combustion.

LONG LIFE —practically unaffected by continuous exposure for years to sunlight or air; more stable than any rubber insulation.

RESISTANT to moisture, acids, alkali and most chemical solvents.

OILPROOF —cutting oils, greases and petroleum solvents do not injure SYNTHOL.

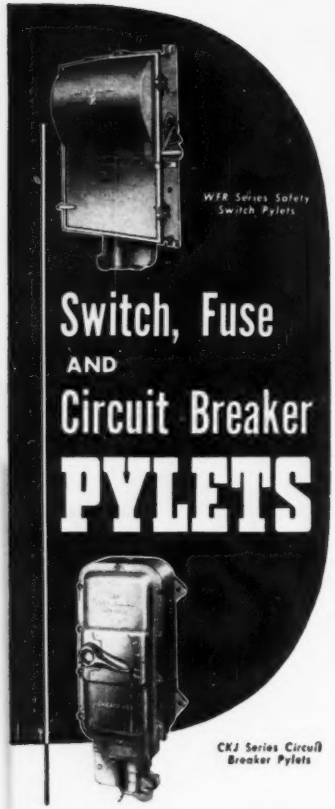
BRIGHT COLORS —non fading, the insulation is the same color throughout so color will not scrape off; easily cleaned; twelve colors.

FREE STRIPPING —makes splicing and soldering easier and faster.

EASY PULLING—because SYNTHOL wires have a permanent clear wax lubrication on their hard, smooth, abrasion resistant surface.

AVAILABLE FROM LOS ANGELES WAREHOUSE
Murphy-Hain Co., 720 E. 2nd St., Los Angeles 12, Calif.

CRESCENT
WIRE & CABLE
CRESCENT INSULATED WIRE & CABLE CO.
TRENTON, N. J.



For Reliable Service Under Most Severe Industrial Plant Operating Conditions

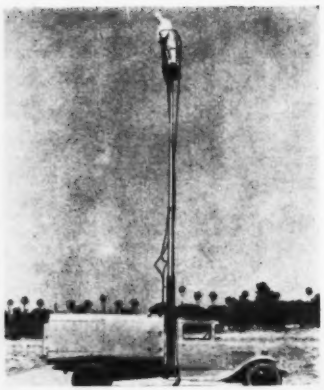
Heavy duty safety switches, fuse boxes with or without plug receptacles, and circuit breaker Pylets provide for reliable service under the severest of industrial plant operating conditions. WFR series safety switch Pylets have heavy cast metal case and cover, quick make and break mechanism interlocked with cover and with plug receptacle, and weathertight gaskets on both cover and hub plate. Safety switches without interlocking plug receptacles are also available. Circuit breaker Pylets, CKJ Series, are but one of the complete line of fuse and circuit breaker fittings, which offer features of sound design and substantial construction to assure reliable service. Consult your Pylet catalog 1100, Bul. 1150 for complete listings.

CONDUIT FITTINGS • FLOODLIGHTS

SINCE 1897

THE PYLE-NATIONAL COMPANY

1364 N. Kostner Ave., Chicago 51, Ill.
Pacific Coast Sales Office
25 Beale Street, San Francisco 6, Calif.



(1215) Available for utility maintenance, these all-steel portable extending towers can be built to extend from 20 to 60 ft., according to requirements. They will fit any truck chassis; are operated hydraulically; controlled either from catwalk or from driver's seat. General Machine & Welding Works, 1100 E. 2nd St., Pomona, Calif.

New F Sun Lamp

(1216) Westinghouse Electric Corp., Pittsburgh 30, Pa.

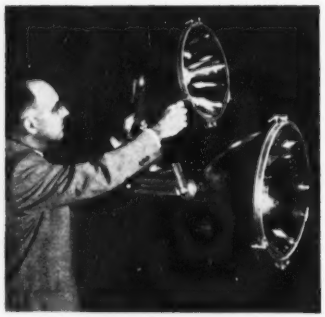
Claimed to be an inexpensive method of bringing sunlight indoors, a new fluorescent sun lamp is available in either 20- or 40-sizes; is identical in dimensions and operating characteristics with standard F lamps. Long and tubular, the new device emits radiations over a large area with an output concentrated in the mid-ultraviolet wave lengths (2800-3200 Angstroms). A soft blue light of low visibility is produced; lamp remains cool enough to be touched by the hand during operation. It has a life of more than 4,000 hours; is suggested by the manufacturer for homes, schools, offices, factories, farms, etc.

(1217) A feature of the new Sunbeam 96-in. slimline 1710 series is the shielding. The 4-lamp unit has a 50°x40° and the 2-lamp, 40°x40° cutoff. The eggcrate louver is hinged from either side for easy maintenance and side panels are of low brightness. The series is available also in standard 40-watt fluorescent with either two or four lamps, and the slimline units can be supplied with 425-ma. ballasts and the new 75-watt T12 lamps. This is a product of Sunbeam Lighting Co., 777 E. 14th Place, Los Angeles 21, Calif.

Improved Armor Cutter

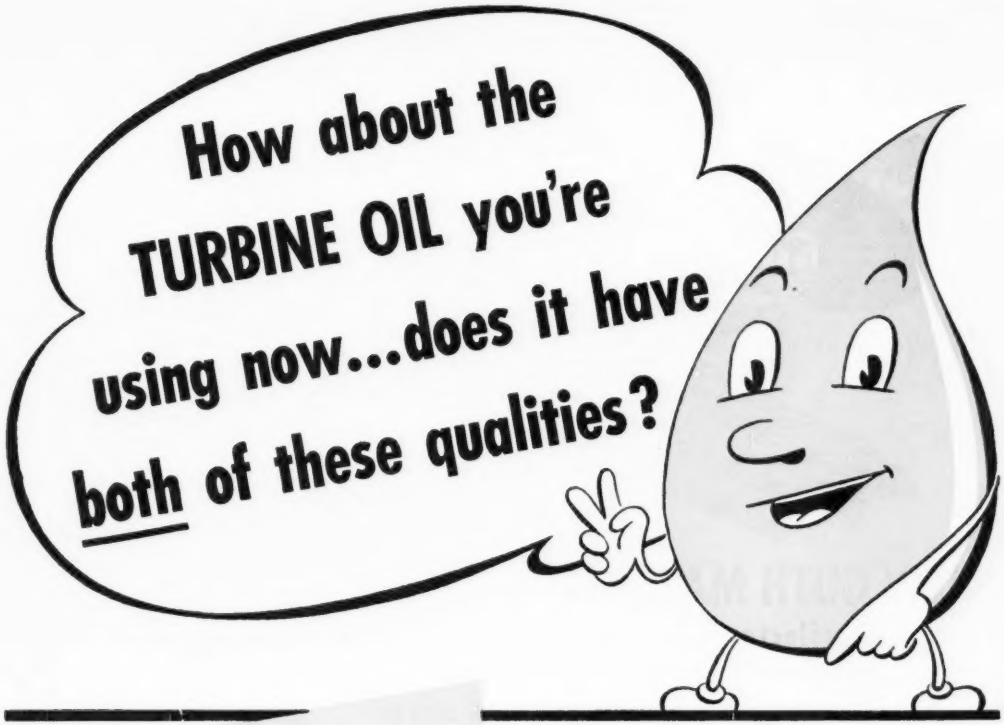
(1218) Ideal Industries Inc., 1042 Park Ave., Sycamore, Ill.

A pocket-sized tool that cuts two or three No. 10, 12 or 14 B-X cable, either large or small diameter, is claimed to be as easy to use as a pair of pliers. This cutter is all steel construction; tip is designed for cutting wire after armor has been cut and removed. Blade may be removed for sharpening or replacement. Over-all length is 10 in. Weight is 10 oz.



(1219) These new heavy-duty, general-purpose floodlights come in a complete range of NEMA types 1 through 5. Units weigh less than 17 lb., are made of non-corrosive materials, are weather tight. Type L-84 (top) is rated 500 watts; type L-85 (bottom), 1,000 watts. Both are available in three standard mountings, with portable base, from G-E Co., Schenectady 5, N. Y.

(1220) This automatic small parts cleaning machine is furnished with baskets, dividers and basket inserts, as well as with cleaning and rinsing solutions. Twelve minutes are required for the complete cleaning cycle. Set available from L & R Mfg. Co., Arlington, N. J.



SHELL TURBO OIL

SHELL

● Ordinary oils are no match for either of the two worst enemies of turbine lubrication — sludge and rust. The ability to withstand those enemies is present only in oils custom-made for turbine lubrication.

SLUDGE RESISTANCE IN SHELL TURBO OIL— **to make turbine oil, Shell selects only crude stocks which are naturally high in sludge resistance (oxidation stability). Then after special refining, Shell Turbo Oil is fortified with Shell-developed additives... to build up even greater resistance.**

RUST RESISTANCE IN SHELL TURBO OIL— **comes from another compound developed by Shell. It is this agent which gives Shell Turbo Oil its exceptional metal-wetting ability and its tough, airtight film.**

The care in manufacturing Shell Turbo Oil pays off for users. Case histories prove that. After *years* of service, no deterioration of the oil, no sludge nor rust anywhere in the oil system — that's the kind of performance this outstanding oil has delivered in installations of all types. Isn't that the kind of performance you want?

NEW GUTH MAZELITE*
hook-on reflector.....
and those Turret Sockets are dandies, too!

That rugged reflector can take it because its GUTH 300° WHITE PERMALUX finish is high-baked to bonderized, zinc-coated steel—*can't* crack, check, chip, craze or peel. Gives over 85% light reflectivity, too!

No more tugs-o'-war trying to remove stubborn reflectors for cleaning! No nuts, clips or gimmicks to get lost or out of order! Mazelite hook-on Reflectors hinge from either side of channel or can be completely removed and replaced instantly.

The new MAZELITE's TURRET SOCKETS speed relampings. Lamps cannot work loose. We'll gladly send you our handy new Pocket Catalog 46A-C with full details about this and other outstanding lighting equipment—compliments of

YOUR TEAMMATE
IN *precision-planned* LIGHTING

Guth LIGHTING

THE EDWIN F. GUTH COMPANY / ST. LOUIS 3, MISSOURI

Leaders in Lighting since 1902

013

(1221) PICKUP—The Vibratab is a frequency pickup the size of an aspirin tablet; weighs less than a gram. According to the manufacturers, it has a life expectancy of 100 to 300 hours and will respond to acceleration frequencies from 3 to over 2,000 cycles per second. Made by Telecomputing Corp., 2901 Hollywood Way, Burbank, Calif.

(1222) PEN—A solenoid-actuated pen claimed to avoid ink-throwing while providing speedy recording has been developed for use on circular chart electronic potentiometers by Brown Instruments division of Minneapolis-Honeywell Regulator Co., Minneapolis 8, Minn. It is a V-type, holds a five-day supply of recording ink.

(1223) RECTIFIER—Dual selenium rectifier elements measuring 7¼ x 12¾ in. have been announced by the International Rectifier Corp., 6809 S. Victoria Ave., Los Angeles 43, Calif. Each dual element consists of two 6¼ x 7¼-in. plates strapped in parallel and rated in a 3-phase bridge circuit at 34 amp. for continuous-duty self cooling, 85 amp. for continuous-duty fan cooling and 340 amp. for highly intermittent duty. These dual elements are assembled in a 3-phase heavy-duty 10-kw. rectifier stack rated at 1,500 amp. for applications such as magnetic inspection. The stacks are designed on the basis of 16 kw. per cu. ft. and have interlocked assembly.

(1224) FLY BOX—A fly box for fishermen incorporates a rotating G-E Alnico permanent magnet; will hold 36 flies in place in strongest breeze but permits removal without damage. General Electric Co., Pittsfield, Mass.

(1225) PORTABLE INSTRUMENTS—A new series of a-c and d-c portable instruments features modern design, scale visibility and improved shielding. Designated model 901 series, these instruments have non-breakable windows. Both a-c and d-c instruments are shielded against external magnetic fields. The 901 instruments available as d-c voltmeters, ammeters, milliammeters, microammeters; 904 as a-c voltmeters, ammeters, milliammeters. Weston Electrical Instrument Corp., 617 Frelinghuysen Ave., Newark 5, N. J.

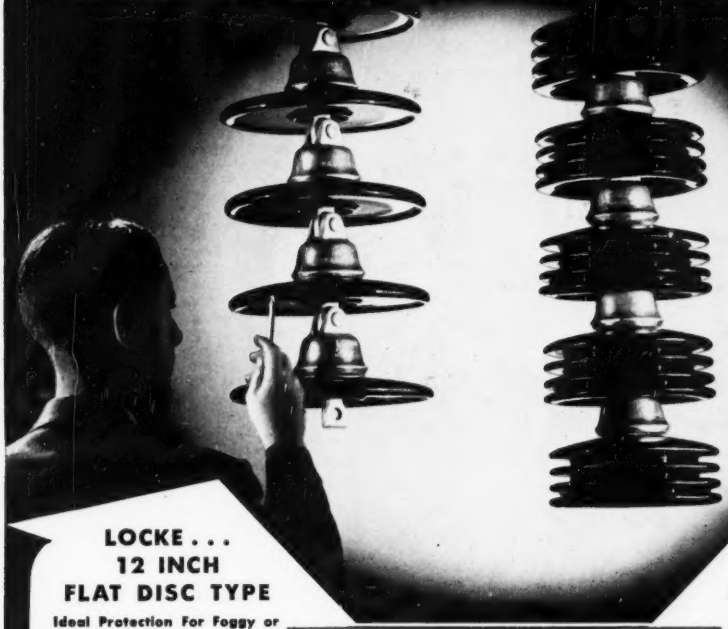
(1226) MOTORS—A new line of totally enclosed flywheel loom motors, incorporating speed and torque characteristics of G-E cast frame loom motors, has been announced in ratings from ¾ to 2 hp., 1,800 to 1,200 r.p.m. General Electric Co., Schenectady 5, N. Y.

(1227) POTENTIOMETER—The "Rectipot," a dual rectilinear unit, has two parallel straight-line resistance units, each with a contacting brush, the two potentiometers being electrically independent but mechanically connected. It measures 1 in. in diameter, length depending on the stroke, which may vary from ½ to 2½ in. The potentiometers may be wound for resistances of 1,000 to 10,000 ohms. Available from G. M. Giannini & Co., 254 West Colorado St., Pasadena 1, Calif.

(1228) WELDING CONTROLS—Two all-electronic, high-speed resistance welding control equipments are available for synchronous and non-synchronous operation. They have no moving parts in power and control circuits except initiation and solenoid relays. Manufactured by Westinghouse Electric Corp., Box 868, Pittsburgh 30, Pa.

For CONTAMINATED Areas-

6 Point FLASHOVER Protection with LOCKE FOG-TYPE Insulators



LOCKE . . . 12 INCH FLAT DISC TYPE

Ideal Protection For Foggy or Contaminated Areas Where *Washing* Wind and Rains Are *Frequent*.

1. Full 12 Inch Shell Diameter assures plenty of clear arcing distance.
2. No Deep Corrugations or Undercuts mean no dirt traps.
3. Smooth surfaces easily cleaned by wind and rain.
4. Open leakage distance, 10¼ inches, simplifies natural and manual cleaning.
5. Large vertical drip distance minimizes possibility of flashover during rainstorms.
6. Small corrugations at pin form barrier on underside which minimize ionized streamers.

When contamination is a major problem, use Locke Fog-Type insulators. You'll find they're especially effective in severely contaminated areas where film deposits—moistened by fog, dew or light rain—can cut insulator flashover voltage by as much as 80%.

Locke Fog-Type insulators are made of rugged porcelain with Compression Glaze. Large diameter pins reduce leakage current concentration at cement line and minimize any tendency to corrode or pit the pin. Ample space between units is provided for hot line maintenance work.

Next time you're up against a contamination problem, get Locke Fog-Types.

"Distributed by General Electric Supply Corporation"

LOCKE
INCORPORATED
BALTIMORE, MARYLAND

. . . LOCKE 10 INCH MULTI-SKIRT TYPE

Ideal For Foggy or Contaminated Areas Where *Washing* Wind and Rains Are *Not Frequent*.

1. Larger shell diameter provides greater arcing distance.
2. No undercut in outside corrugations permits easy cleaning by wind and rain.
3. Vertical skirt inside shell provides additional *protected* leakage distance.
4. Leakage distance balanced with parallel arcing paths means efficient utilization of full 18" leakage distance.
5. Less shell depth provides greater vertical drip distance.
6. Small corrugations at pin minimize ionized streamers.

Before you buy STOP! See what Locke's Got . . .

ILLUMINATION IN THE MAKING

SEPARABLE HOOD SIGN REFLECTOR

HEAVY DUTY VAPORPROOF REFLECTOR

THE EDUCATOR
MFD. UNDER SILVRAY
PATENT NO. 2303747

RLM STANDARD DOME REFLECTOR

THE SIRIUS

RLM SOCKET TYPE GLASSTEEL DIFFUSER

THE MASTER FLOODLIGHT

A simple step in the process of manufacture... some might take it for granted...we don't. The careful, precision forming of a reflector neck is an important process to the man at whose machine a veritable catalog of Smoot-Holman reflectors and luminaires begins to take shape.

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INGLEWOOD CALIFORNIA
MADE IN U.S.A.

Offices in Principal Western Cities—Branch and Warehouse in San Francisco

(1229) PHOTOELECTRIC CONTROL—A new high-speed sensitive control type 23LF3 has as its most general use maintaining of an accurate register of paper and cellophane being processed for bags and wrappers. Made by Photoswitch, 77 Broadway, Cambridge 42, Mass.

(1230) FAN—An automatic 8-in. ventilating fan for built-in installation where wall space is limited is known as Radia Model 1: is available from Shepler Mfg. Co., 1312 Sheffield St., Pittsburgh 12, Pa.

(1231) BALLASTS—An improved line of 30-, 32- and 40-watt uncorrected-power-factor ballasts for fluorescent lamps has been redesigned in all basic components to reduce noise of operation. Dimensions have been changed to permit use of the ballasts with a wide variety of F fixtures. General Electric Co., Schenectady 5, N. Y.

(1232) TIME SWITCH—A plug-in poultry time switch for morning lighting only is preset at factory to turn on lights automatically at 4 a.m. every day. It can be set as desired to turn off at 5, 6, 7 or 8 a.m. Paragon Electric Co., Two Rivers, Wis.

(1233) BUSHING—A reducer bushing for conecting a 6-in. wireway to 4-in. size is made of heavy metal 7½ in. square with a 4-in. opening in the middle. Fastened by bolts to the flanges of the wireways, this reducer forms a rigid connector between the two sizes. Sides of wireways have knockouts ranging in diameter from 1 to 2½ in., spaced 3 in. apart. A hinged cover facilitates wiring. Keystone Mfg. Co., Center Line, Mich.

(1234) COMBINATION—A visible oil cup and visible oil gage in one unit has been announced by Trico Fuse Mfg. Co., 2948 N. 5th St., Milwaukee 12, Wis. Available in 1-, 2-, 4- and 8-oz. capacities.

(1235) DISPENSER PACKAGE—Cuffed paper insulation for rotor and stator slot insulation is now packed in a carton designed to allow any length of the coil to be pulled from a dispenser slit in the top front. A vertical slit in the side of the package allows the user to estimate the amount of stock left. Available widths between cuffs range from 1 to 4½ in. in ¼-in. steps; standard cuff width is ⅛ in.; comes in .010- and .015-in. thicknesses in two grades of paper, an all-rag electrical insulating paper and a pure wood pulp. Insulation Mfgers. Corp., 565 W. Washington Blvd., Chicago 6, Ill.

(1236) DEVICES—Following purchase of the Bailey Electric Co., San Francisco, a new line of power connectors, terminals and bus supports is being manufactured by the A. B. Chance Co., Centralia, Mo.

(1237) MOTOR—Designed to meet the needs of many timing, recording, indicating and switching applications requiring accurate reset operation, the type SXC synchronous motor with a differential clutch mechanism has been anounced by the R. W. Cramer Co., Centerbrook, Conn. This motor produces 30 in./oz. of torque at 1 r.p.m.

(1238) STARTER—Designed for the 32-watt circline F lamp, the FS-12 has been put on the market by Sylvania Electric Products, 500 Fifth Ave., New York 18, N. Y.

SILVER CONTACT SURFACES

to eliminate oxidation troubles

AT NO INCREASE IN PRICE

POWER CONNECTORS

SILVER is used exclusively on *all* G-E connectors because it allows power to flow between conductor and connector with no losses or overheating. This helps eliminate annoying oxidation problems that are a definite maintenance item. The more a connector heats up, the more it oxidizes; and the more it oxidizes, the more it overheats. This vicious cycle continues until the connector fails.

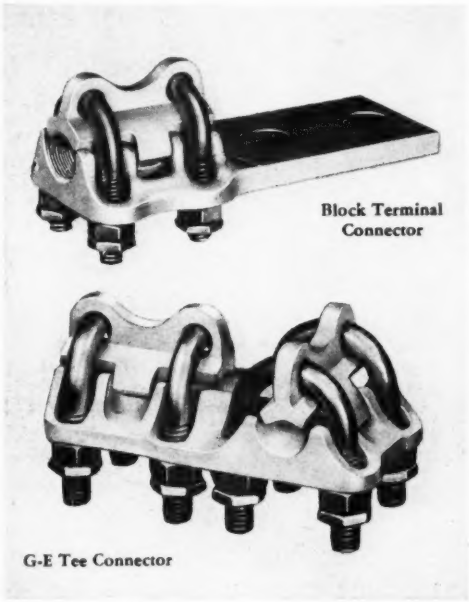
CORRECT MATERIAL for the job is another feature assuring you that G-E connectors "run cool." The composition of the alloy used permits the connectors to carry the maximum current of any conductor on which they are used . . . with no losses and without overheating. By using G-E connectors you're assured of long connector life because of silver contact surfaces and ample current-carrying capacity; double safeguards against oxidation troubles and they don't cost you a cent extra.

CHECK THESE ADDITIONAL FEATURES . . .

SERRATED CONTACT SURFACES give extremely high pull-out strength and a permanent, high-conductivity joint that will resist vibration and give positive pressure on the conductor at all times.

NON-CORRODIBLE HARDWARE is of high-strength bronze alloy that gives tight and trouble-free service. G-E connectors will not twist, distort, or season crack.

INTERLOCKING SIDES confine the strands of the conductor within the conductor enclosure, thus obtaining full advantage of the conductor's current-carrying capacity.



Block Terminal Connector

G-E Tee Connector

Place an order today with your G-E sales representative and start realizing the many benefits to be gained by using this new line of General Electric connectors. Also, write for a copy of bulletin GEC-400 that contains 40 pages of valuable information on G-E connectors, and see for yourself how easy they are to order. Write to *Apparatus Department, Section 856-52, General Electric Company, Schenectady 5, New York.*

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American Collapsible Power Reel
(CR No. 5188)

for stringing and recovering wire is designed to operate from end of extended winch shaft on side of body. Adaptable to any Standard winch extension.

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mounts at rear of body; works at any angle; tension type roller keeps line in proper position at all times. Large 8" diameter of sheave increases winch line life.

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for pulling trailers fits any standard ½, ¾ or 1-ton truck. Safest hook on the market—spring-loaded plunger keeps latch closed, prevents accidental unlatching. Drop forged from high strength steel.

Check American's Full Line of accessories for making your trucks more useful—includes detachable winch capstans, demountable vise brackets for pipe and machine vises, thermostatic water casks, cabascopes, etc. Write NOW for descriptive literature and prices.

Our centrally located factory in Oakland assures quick delivery.

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432 Fifth St., Oakland 7, California

BULLETINS ETC.

(1239) TIMERS—Answers to time control problems are contained in a new 16-page catalog, giving information, specifications, wiring diagrams and prices. Available as bulletin 1010L from Sangamo Electric Co., Springfield, Ill.

(1240)—CABLE—Technical data, inspection procedures, research facilities and wiring information are contained in General Catalog 500, issued by Triangle Conduit & Cable Co., 1904 Jersey Ave., New Brunswick, N. J.

(1241) DEVICES—Guide for selection of Double-Diamond equipment for signaling and temperature control is given in a 16-page catalog available from H-B Instrument Co., 2633 Trenton Ave., Philadelphia, Pa.

(1242) CABLE SPLICING—Kits for making terminations and 2-way joints of rubber-insulated neoprene jacketed 1/c and 3/c cables are described in bulletin CJ6 of G & W Electric Specialty Co., 7780 Dante Ave., Chicago 19, Ill.

(1243) AWARDS—The 1950 National 4-H Farm and Home Electric Awards program is the subject of a 4-page leaflet available from Westinghouse Electric Corp., Pittsburgh, Pa.

(1244) EQUIPMENT — More than 5,000 items and sizes of electric supply and equipment are listed in the new 1950, 68-page catalog of Tri-State Supply Corp., 544 S. San Pedro St., Los Angeles, Calif.

(1245) DOMESTIC HEATING—A catalog of Chromalox domestic electric heating equipment has been anounced by Edwin L. Wiegand Co., 7540 Thomas Blvd., Pittsburgh 8, Pa.

(1246) INDUSTRIAL HEATING — The new Chromalox catalog of industrial heaters lists standard units, many of them new. Four basic units, with variations in wattage, voltage and sheath material are listed, and selection and application data are given. Available from Edwin L. Wiegand Co., 7540 Thomas Blvd., Pittsburgh 8, Pa.

(1247) TRANSFORMERS—A new catalog, AC 178 published by Acme Electric Corp., Cuba, N. Y., gives specifications on air-cooled transformers from 1/10th to 50 kva. and describes design and construction improvements.

(1248) GENERATORS—Points to look for when ordering a-c generators are listed in an 8-page bulletin 2200-PRD-196, issued by Electric Machinery Mfg. Co., Minneapolis 13, Minn.

(1249) LIGHTING KIT—A planning kit to help in preparing pattern lighting layouts is available from Mitchell Mfg. Co., 2525 Clybourn Ave., Chicago 14, Ill. The 11x14 folder contains a transparent plastic scale rule and three modular planning grid sheets. The rule contains cutout templates of Module units in 1/8- and 1/4-in. scale. The grid sheets give two scales: 1/4 and 1/8 in. to the foot.

(1250) DETECTOR—Design and operation of an electronic metal detector are explained in a 20-page bulletin prepared by Allis-Chalmers Mfg. Co., S. 70th St., Milwaukee, Wis. It may be used on conveyor installations at speeds ranging from 15 to 600 ft. per minute with full sensitivity, according to the manufacturer.

(1251) CABLE SIZES—Method of determining cables and cable sizes of asbestos-varnished cambric cables, types AVA, AVB and AVL, are given in a booklet issued by General Electric Co., construction materials department, Bridgeport, Conn. It is listed as publication 19-269.

ELECTRICAL WEST, 68 Post St., San Francisco 4, California
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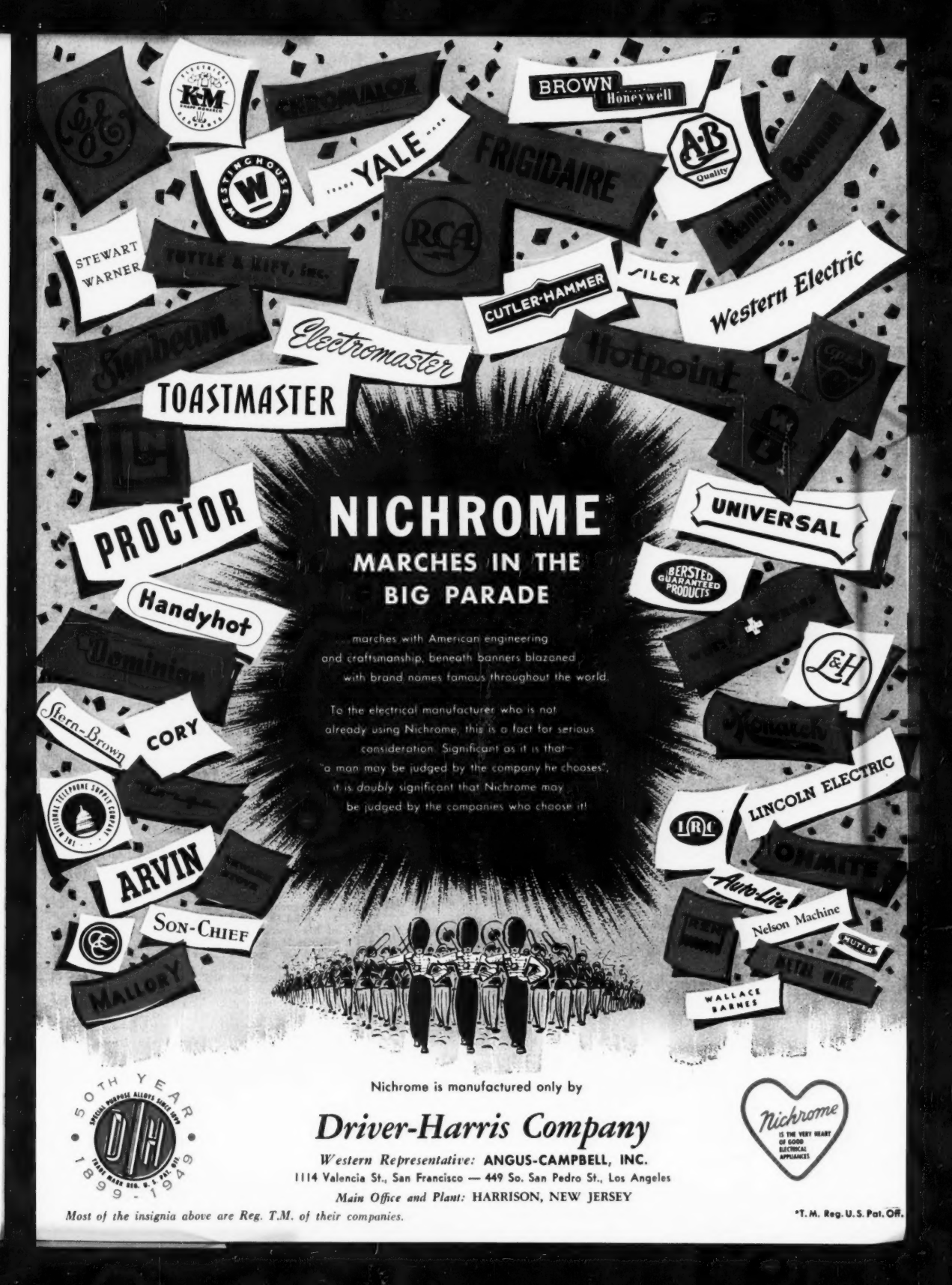
* Please include your company's name and your position, as we cannot ask manufacturers to furnish literature unless you do.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ELECTRICAL BOOKS

INSTRUMENT AND CONTROL MANUAL FOR OPERATING ENGINEERS, by Eugene W. F. Feller, 426 pages, 6x9, McGraw-Hill Book Co., $6. Gives finger-tip information for quick and sound solution of specific metering and control problems. It explains the basic principles of control and describes the construction and operation of liquid-level, pressure, temperature, speed, and humidity indications and controllers. Operating fundamentals of each primary element of a control mechanism are clearly described to give a complete understanding of physical characteristics.

BASIC ELECTRONICS, by Royce G. Kloeffler and Maurice W. Horrell, 435 pages, 6x9, John Wiley & Sons, $5. Covers the fundamental theory of electronics in unusually condensed form. Authors assume the reader has a knowledge of elementary physics, but no previous training in electronics. Many diagrams and equations are included to clarify discussion in the text. Standard ASA and IRE letters and graphical symbols are used in diagrams and equations. Problems supplement all the basic chapters.

HOW TO SERVICE RADIOS WITH AN OSCILLOSCOPE, Sylvania Electric Products Inc., 500 Fifth Ave., New York, $8\frac{1}{2}$x11, $1. Designed as a practical reference for radio, television and amplifier servicemen; radio operators; students and electronic technicians. Contains more than 90 diagrams, tables and schematic circuits, including many waveform patterns as they appear on the face of an oscilloscope in actual service application.

STEEL ELECTRICAL RACEWAYS, by American Iron and Steel Institute, 350 Fifth Ave., New York, $5\frac{1}{2}$x$8\frac{1}{2}$, 131 pages, single copy $1 (50c in quantities). Provides the installer, the inspector, designer and engineer with a single complete and convenient reference source for information on rigid steel conduit and electrical metallic tubing. Contains all of the basic dimensional data as well as the necessary National Electric Code tables that pertain to conduit wiring installations. Should be especially valuable to the wireman on all conduit wiring jobs.

ELEMENTS OF SOUND RECORDING, by John G. Frayne and Halley Wolfe, 685 pages, 6x9, John Wiley & Sons, $8.50. A discussion of basic problems in sound recording and reproducing for the designer, engineer, technician and student. Covers in detail those subjects which belong peculiarly to the restricted field of sound recording, and reproducing and which are not discussed in books devoted to the allied fields of electronic and radio engineering.

METALLURGY AND MAGNETISM, by James K. Stanley, 150 pages, American Society for Metals, Cleveland, $4. Consists of four illustrated chapters covering magnetic theory and definitions; type of magnetic materials (soft magnetic materials and permanent magnets); factors affecting magnetic properties (product factors and chemical and structural factors); and magnetic analysis —a metallurgical tool. Can be used as an introductory text on ferro magnetism and types of magnetic materials.

What does USKON® Electric Heating mean to Electric Light and Power Companies?

Uskon is first of all the nearest thing to perfect heat yet devised . . . from the standpoint of human health . . . for its extremely efficient utilization of power services.

THE MOST HEALTHY HEAT EVER PERFECTED

Uskon provides uniform heat from head to foot, primarily warming *objects*, not the air. Floors and walls are always warm, humidity remains constant. The air is more fresh, and colds are fewer. Uskon represents what is unqualifiedly the greatest sanitary and hygienic advance in the history of home heating. To be a prime factor in bringing it to more and more people is a fact of great public relations value to the utilities.

PROVIDES MOST EFFECTIVE USE OF SERVICE LINES

But Uskon approaches the theoretically perfect heat for other reasons too. It heats people and objects. Uskon does not have to count on a large excess capacity to overcome lag and give fast pickup as do convection heat systems. With Uskon, detailed engineering specifications are completed for each home. This careful design means that the utility is assured the most efficient use of its equipment and services.

AVOIDS SEVERE STRAIN ON SECONDARIES

Most electrical heaters marketed today are of the convection type. They labor to heat the *air*, building up sudden heat loads and putting severe strain on the utility system. Uskon always supplies radiant heat—directly balancing the body heat loss. With group installations, Uskon shifts the wintertime peak from the evening to the morning, just when the distribution transformers are in the best position to handle it. And because of Uskon's individual room control, peaks in the load are reduced to the absolute minimum through diversification.

THE PATTERN FOR THE FUTURE

Uskon electric radiant heat, because of its healthfulness, cleanliness, convenience and ease of operation, is destined to play an even larger part in home heating. Uskon is a product of United States Rubber Company and is distributed exclusively by Graybar Electric Company.

Electric heat of the radiant type, like Uskon, reduces peak loads and provides favorable load factors.

We welcome inquiries seeking more complete information about Uskon. One of our sales engineers will supply any facts required. Write Electrical Wire and Cable Department, United States Rubber Company, 1230 Avenue of the Americas, New York 20, N. Y.

Uskon is an electrical radiant heating system utilizing rigid panels placed in the ceiling

USKON USES ELECTRICAL ENERGY ECONOMICALLY BECAUSE:

1. **Effective utilization of radiant waves primarily heats people and objects—not air.**
2. **Rigid engineering specifications of installation and insulation are observed.**
3. **Uskon allows individual room control.**

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Electrical Wire and Cable Department, Rockefeller Center, New York 20, N. Y.

ELECTRA'S HUSBAND

JUNIOR ACHIEVEMENT BENEFITS EVERYBODY

"WHAT'S that you're using?" I asked Electra one evening recently as I walked into the kitchen just as she was finishing the preparation of dinner.

"It's an old fashioned wooden potato masher," she answered. "We had one on the ranch when I was a youngster and I've always wanted another. Today a high school boy came to the door selling them. He said a group down at Galileo had organized the Marina Kitchen Utensil Co. and were going to make a number of useful kitchen gadgets. And could that boy sell! Some of your critical sales manager friends ought to keep a line on him. He was just like the old-time vacuum cleaner salesmen. He just wouldn't take 'no' for an answer."

"Let me look at it," I said. "Not bad. It will break up ice cubes too and the handle is just the right shape for an old-fashioned muddler."

"I'll have to tell the youngster about that when he comes again," Electra interrupted. "They are going to make some other things and he said he would show me the samples. He certainly was an enterprising lad."

"Encourage him," I said, "because he and his group undoubtedly are a part of the Junior Achievement movement. I didn't know that they were functioning here as yet."

"What's Junior Achievement?" she asked. "I seem to remember something about it."

"There was a story about it in *Readers Digest* not long ago," I continued. "Junior Achievement is a national movement which aims to inculcate some of the principles and ideals of business into the high school kids of this country. It originated in the East and it has been spreading across the country like wildfire.

"Some time ago a group of business people became convinced that the only way the American individual enterprise system could be strengthened and perpetuated would be to have the American people get a better understanding of the system and why it has done so much for them as individuals and for the nation as a whole. Only then would people support and vote for those concepts and measures which are in the interest of the system and work against and vote against those ideologies and proposals which are aimed at weakening and destroying the system. Almost everyone interested in preserving the American system is agreed that the schools hold the key to the economic course the country will follow."

"But how does that tie into this Junior Achievement thing?"

"I'm coming to that. Obviously one of the best ways of teaching youngsters something about business is to let them get into business and face some of the problems that confront businessmen. Strangely enough in one of the Eastern cities some high school kids did that very thing. Because they were having trouble they went to a business executive for help. He showed them what was wrong, counseled with them on the proper steps to take and helped them put their enterprise on its feet.

"Out of that simple case grew the national movement which now involves thousands of companies in hundreds of communities throughout the East and Middle West. It works like this:

"A group of high school youngsters with some practical salable ideas form a company. They estimate their capital requirements and they sell stock at a maximum price of 50 cents a share. They set up a corporate organization and elect officers. If they require machinery, they invest some of their capital in machines and tools. Some also is required for working funds. In all of this they receive counsel and guidance from a top business executive. Then, if the operations warrant, they also get help in production techniques from an expert in that field, in accounting from an accountant and in sales and promotion from a sales executive. These latter people are usually junior executives in some one of the larger companies in the community.

"The companies only operate for a school year and then they are liquidated. During all of this the youngsters are shown what it takes to run a successful business. They learn that investors must have a return on the money they put into a business. They find out why a business must operate at a profit. And they learn how better methods of production reduce costs and how essential it is to advertise and promote."

"Gee, that sounds like a fine program," Electra commented.

"It is," I continued. "You'd be surprised at the breadth of things that some of the kids do. They have companies that specialize in baby-sitting and shining shoes. They manufacture every conceivable kind of thing from aprons and doll clothes to plastic gifts and polishing compounds. They make garden tools and household supplies.

"But best of all they really find out how tough it is to make a business function. They learn soon that the way to accumulate is to work and that the public wants value received.

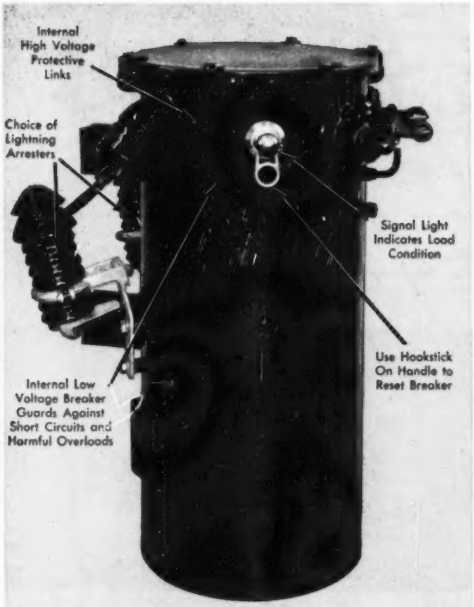
"There was the case of the youngster in a New Jersey town who started out to organize the workers in the company in which he worked because he felt they needed higher wages. He thought they ought to strike. You see he had to ride the bus to work. The fare to and from his home was ten cents. He only worked two hours an afternoon and his wages were ten cents an hour.

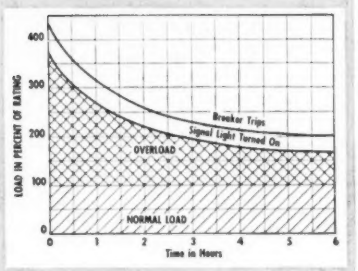
"Well they made him treasurer of the company and he forgot all about striking when he worked up the first balance sheet. Strangely enough the kids aren't the only ones who benefit. Business men who work with them soon learn that they can ask the most penetrating questions. So the sponsors have to study too to keep up with them. In the case of some of the junior executives who worked as specialists this has proved to be a good thing. One of these people was recently made the comptroller of his company. Another became the chief engineer. But the real payoff comes from the inward satisfaction."

"Why don't you get into it?"

"I'm just waiting until they get enough local companies organized so that they will have to dip that deeply into the barrel."

HERE'S *Premium* TRANSFORMER PROTECTION


Internal High Voltage Protective Links
Choice of Lightning Arresters
Signal Light Indicates Load Condition
Use Hookstick On Handle to Reset Breaker
Internal Low Voltage Breaker Guards Against Short Circuits and Harmful Overloads



Useful capacity of ACP transformer is increased with secondary breaker, actuated by either or both load current and oil temperature.

New ACP* (*Allis-Chalmers Protected) Transformers Give You...

- ✓ FULL ELECTRICAL PROTECTION
- ✓ MORE EFFICIENT LOADING
- ✓ SIGNAL LIGHT INDICATION
- ✓ GREATER SERVICE CONTINUITY

ONE OF THE BEST investments you can make is to be *sure* of maximum transformer protection against electrical damage... especially in concentrated load areas where service continuity is highly important. You can get this protection by specifying Allis-Chalmers ACP* transformers.

With these units, much of the normally unused safety margin capacity now becomes part of the actual transformer range, permitting loading much closer to the actual limit of the windings. Result — more kva output per kva transformer rating. Secondary breaker which is actuated by *either or both load current and oil temperature* protects against both sustained and short time overloads.

For additional information about *premium* ACP* protection —or other Allis-Chalmers protective transformer arrangements — contact your nearby A-C sales office, or write direct.

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ALLIS-CHALMERS

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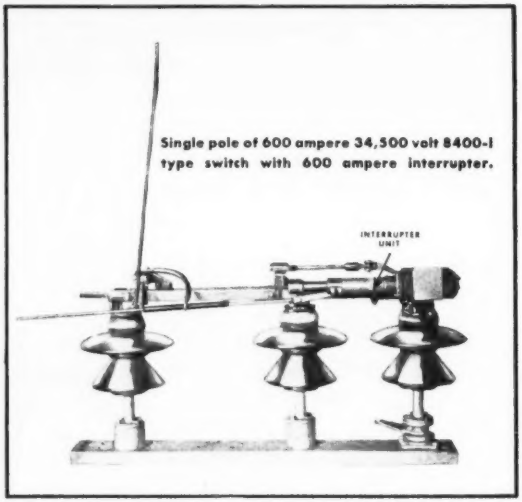
Are you getting a MODERN EFFICIENT SWITCH?

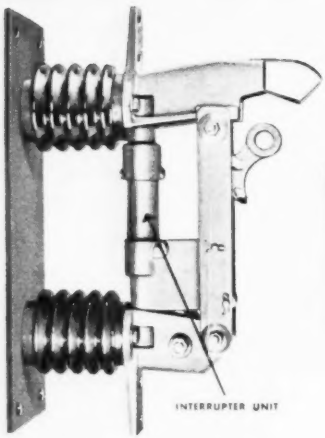
In selecting your power switching equipment, are you meeting today's fast developing new conditions, and also keeping an eye to the future? Constantly increasing loads demand more flexibility in operation. Greater efficiency in switching lines and feeders are a "must" for today and tomorrow. The best way to make sure you are keeping abreast with these conditions is to

SPECIFY THREE E AIR INTERRUPTER SWITCHES



Single pole of 600 ampere 34,500 volt 8400-I type switch with 600 ampere interrupter.

Outdoor switches are available up to 46,000 volts with 600 ampere interrupting capacity and up to 69,000 volts with 200 ampere interrupting capacity. Ask for Bulletin 331.



Single pole of 600 ampere 15,000 volt switch with 600 ampere interrupter.

Indoor switches are available up to 15,000 volts and to 600 ampere interrupting capacity. Ask for Bulletin 141.

Our patented interrupter unit enables these switching operations to be successfully performed.

1. **Interrupt load current up to rated capacity.**
2. **Sectionalizing feeder and distribution circuits.**
3. **Interrupting magnetizing current of transformers.**
4. **Interrupting charging current of busses, lines and cables.**
5. **Interrupting exciting current of feeder regulators.**
6. **Switching charging current of capacitor banks.**

- The arc created by circuit interruption is confined and extinguished inside the arcing chamber of the interrupter unit. There is no burning or pitting of contacts and no system disturbances.
- 115,000 volt switches are also available for special applications.

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ELECTRICAL ENGINEERS EQUIPMENT CO.

MELROSE PARK, ILLINOIS

DECEMBER, 1949 Vol. 103, No. 6

ELECTRICAL WEST

SPOKESMAN FOR THE MOST HIGHLY ELECTRIFIED SECTION OF THE U. S.

Will America Follow the British Road to Socialism

asks J. E. Corrette Jr.

Vice-president, Montana Power Co.

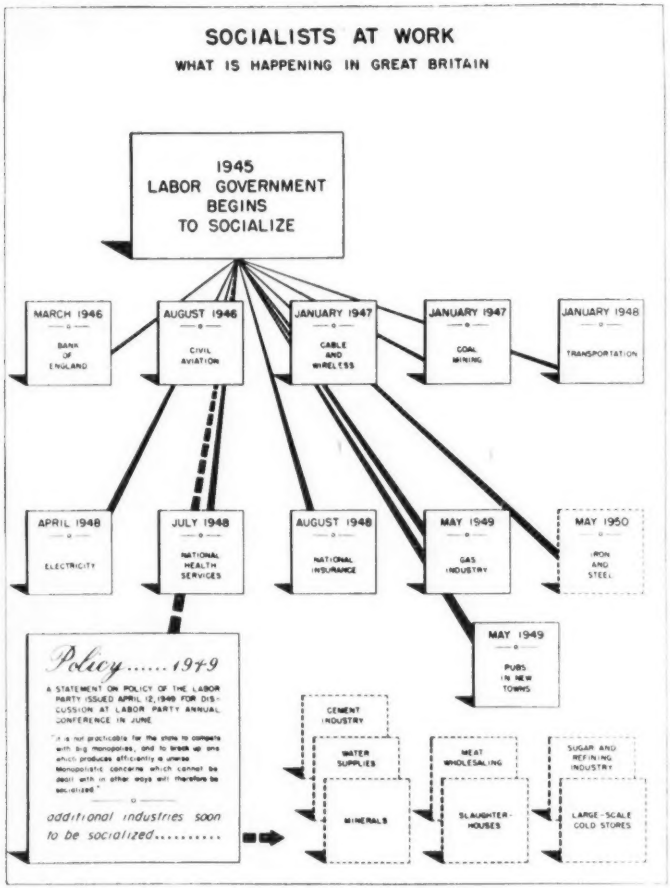

SOCIALISTS AT WORK
WHAT IS HAPPENING IN GREAT BRITAIN
1945 LABOR GOVERNMENT BEGINS TO SOCIALIZE
MARCH 1946 BANK OF ENGLAND
AUGUST 1946 CIVIL AVIATION
JANUARY 1947 CABLE AND WIRELESS
JANUARY 1947 COAL MINING
JANUARY 1948 TRANSPORTATION
APRIL 1948 ELECTRICITY
JULY 1948 NATIONAL HEALTH SERVICES
AUGUST 1948 NATIONAL INSURANCE
MAY 1949 GAS INDUSTRY
MAY 1950 IRON AND STEEL
MAY 1949 PUBS IN NEW TOWNS
Policy.....1949
A STATEMENT ON POLICY OF THE LABOR PARTY ISSUED APRIL 12, 1949 FOR DISCUSSION AT LABOR PARTY ANNUAL CONFERENCE IN JUNE
"It is not practicable for the state to compete with big monopolies, and to break up one which produces efficiently a unique Monopolistic concerns which cannot be dealt with in other ways will therefore be socialized."
additional industries soon to be socialized.....
CEMENT INDUSTRY
WATER SUPPLIES
MINERALS
MEAT WHOLESALING
SLAUGHTER-HOUSES
SUGAR AND REFINING INDUSTRY
LARGE-SCALE COLD STORES

Fig. 1

The charts used in this article were prepared by J. B. Thomas, president, Texas Electric Service Co., and are used with his permission. Discussion is based upon a presentation before the Rocky Mountain Electrical League annual meeting at Estes Park, Colo.

THE history of this nation has seen two distinct stages in the development of natural resources and business. At one time, the federal government lent its assistance to private industry for the purpose of developing new areas, promoting new business, putting more property on the tax rolls and encouraging private investment and private ownership. Witness the assistance given the railroads in the last century when free right-of-way, land grants and special legislation helped the railroad companies carve new empires in the West. It was this type of federal aid that gave the United States the highest standard of living the world has even known.

Now a different philosophy is being applied. It is a philosophy which calls for federal government ownership and operation of business, with the result that private individuals and concerns are being "frozen out" of the fields in which they have operated. This new philosophy is depriving the people of an opportunity to invest their savings in sound, economical, tax-paying business enterprises, and is emphasizing the "something-for-nothing" welfare state, in which the citizens rely upon the largesse of their government instead of their own initiative.

This trend can end in nothing less than state socialism. And when that comes, we will find our industries operated by the government, without the necessity of efficient operation and business management. Taxes, which will grow higher and higher, will be available to buoy up industries which otherwise could not make their way.

The matter of heavier taxation is already facing us today. The Council of State Chambers of Commerce recently compiled an analysis of the administration's welfare state programs, in-

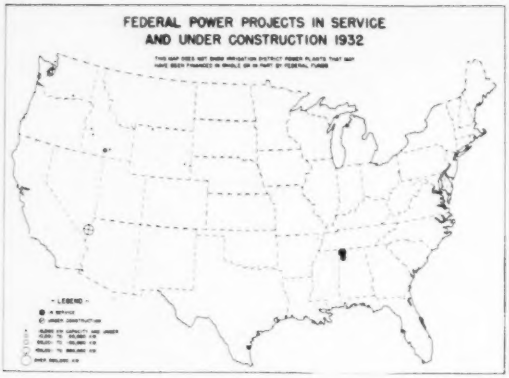


Fig. 2

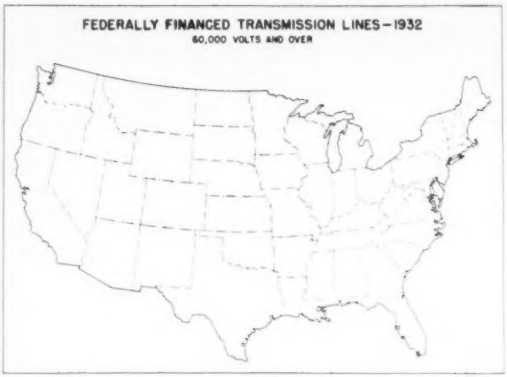


Fig. 5

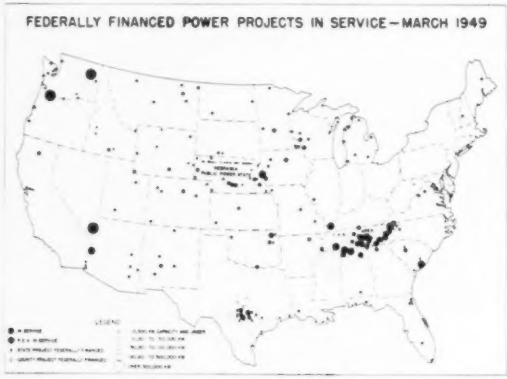


Fig. 3

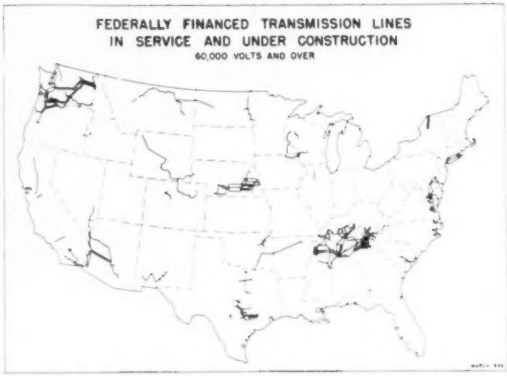


Fig. 6

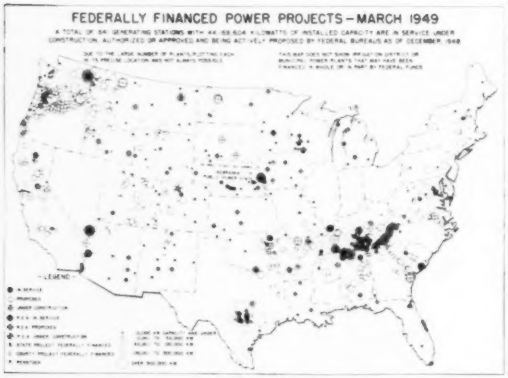


Fig. 4

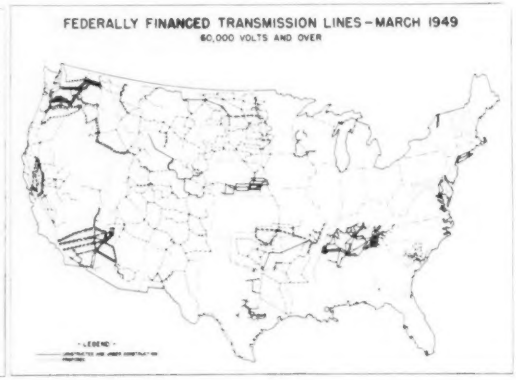


Fig. 7

cluding federal housing, socialized medicine, federal aid to education, farm subsidies and other projects enacted or promised the people of the nation, and showed what these programs will cost the taxpayers.

It is safe to say, the council pointed out, that if these programs were fully under way, they would add about $13.8 billion annually to the present federal tax load. In coming years, they would add between $15.9 billion and $34.3 billion annually to the federal tax burdens borne by this generation, while during the next generation, the costs would mount to between $17.4 billion and $38 billion annually.

Let's see what this means. A married man with two children now pays about $143 a year in federal income taxes on a salary of $300 a month. If

these welfare state programs were put into action, a member of the next generation under identical circumstances as our man with a $300 a month salary would see his federal income taxes rise to more than $275 a year.

If these proposals now before Congress were enacted into law, a married man with two children who makes $500 a month would see his federal income taxes rise from the present level of $525.60 a year to as much as $1,012 a year—almost double the present level.

Think it over. Are the bargains worth the price tag?

British Socialism on the March

The first figure that illustrates this discussion shows the advance of state socialism in Great Britain. This is what is happening in England today—and what could happen here if the welfare state idea grows and gains root. As this figure explains, British leaders started with a few key industries and have expanded their control steadily, now planning to nationalize other industries important to the economic life of the nation. It is interesting to note that some of the industries now marked for nationalization are classified as "sure profit getters" and are being socialized to balance the losses of previously nationalized industries.

Trend Toward Government Control Is Rapid

Six of the illustrations show the trend toward federal government control of the electric power industry. The last figure reveals the top-heavy tax structure that now characterizes the federal government.

Fig. 2 shows what the United States looked like from a federal power viewpoint in 1932. Then, there were only eleven projects in service and under construction in the entire nation, and most of these were small.

Fig. 3 shows the federally financed power projects in service as of March 1949. Compared with the first chart, they have grown tremendously, but excluding REA plants, TVA, Nebraska and Bonneville Power Administration regions, there still are not many.

But, as shown in Fig. 4, practically the entire nation would be covered by federally financed power projects in service, under construction, authorized or approved at the present time.

Fig. 5 shows that as little a time as 16 years ago the federal government's transmission line program had not started. This map, in 1932, shows no lines of 60,000 volts or more.

But in 1949 (Fig. 6) federally financed transmission lines in service and under construction have grown

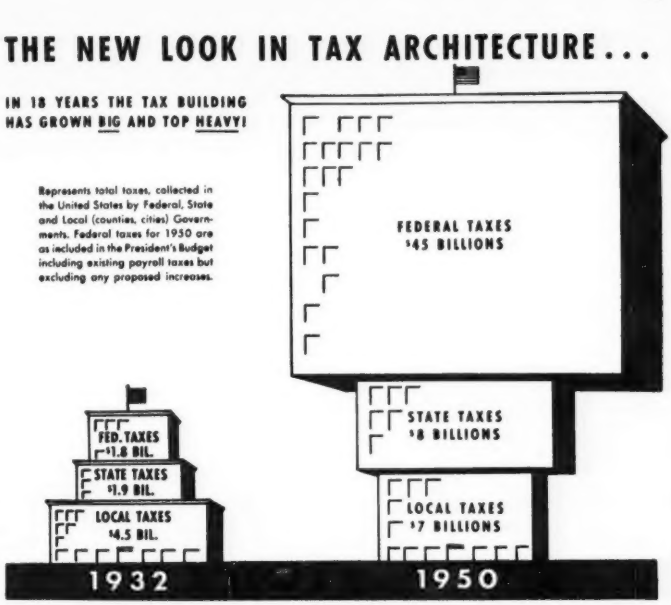

THE NEW LOOK IN TAX ARCHITECTURE...
IN 18 YEARS THE TAX BUILDING HAS GROWN BIG AND TOP HEAVY!
Represents total taxes, collected in the United States by Federal, State and Local (counties, cities) Governments. Federal taxes for 1950 are as included in the President's Budget including existing payroll taxes but excluding any proposed increases.
FEDERAL TAXES $45 BILLIONS
STATE TAXES $8 BILLIONS
LOCAL TAXES $7 BILLIONS
FED. TAXES $1.8 BIL.
STATE TAXES $1.9 BIL.
LOCAL TAXES $4.5 BIL.
1932
1950

Fig. 8

considerably. These, like the power plants, are concentrated principally in the Tennessee Valley, Nebraska and the Pacific Northwest.

But, as shown in Fig. 7, practically the entire nation, with the exception of the northeastern states, is covered by a transmission grid system of federal lines constructed, under construction or proposed in 1949.

Fig. 8 suggests what happens when the federal government's spending program gets out of hand. As the chart explains, in 1932 local and state taxes took $6.4 billion and federal taxes took $1.8 billion. In 1950, state taxes will take $15 billion, while federal taxes will have grown to $45 billion, making the nation's tax architecture unsound. This unsoundness may grow and grow as federal spending for power plants and transmission lines—and other phases of government encroachment—continues and increases.

A Program of Cooperation Is Needed

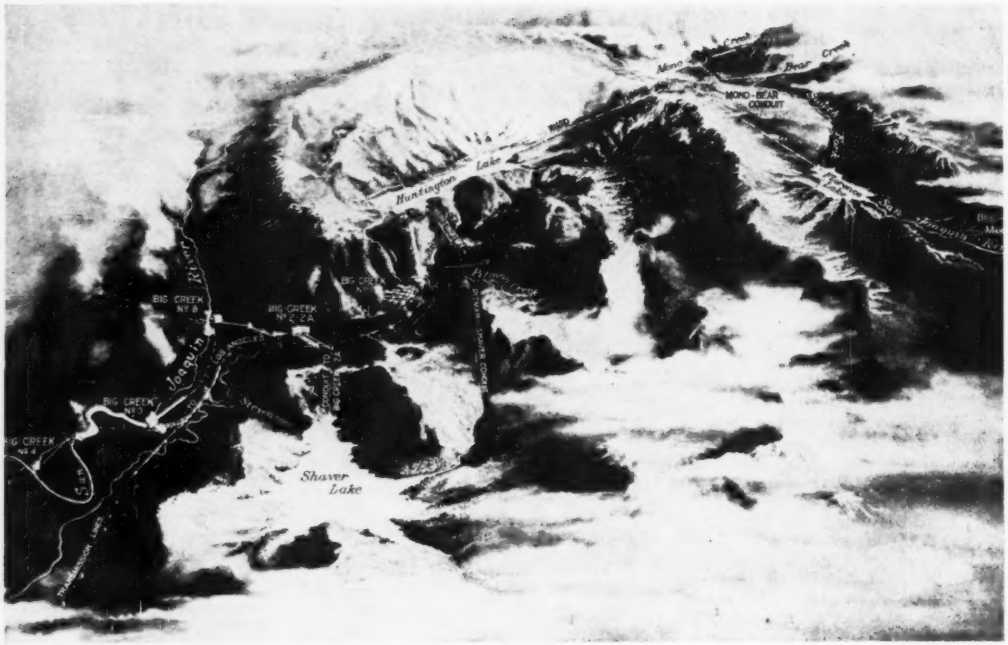
It is not too late to stop this growth of the welfare state and the domination by government of industry in the United States. But every citizen will be required to apply his actions and his resources to the problem. One of the surest ways to stop this growth is to impress upon our legislative and congressional representatives a public feeling for the necessity of maintaining our individual enterprise and freedom.

The electric power industry today needs a program of cooperation in which the federal government's power system will draw on private companies for supplying important services to consumers. The private companies can and will build and operate the necessary transmission lines and distribution systems, and can deliver to the people all of the government power that can be produced at federal projects. The private companies can deliver this power in such a way as to pass on to the public and to the taxpayers any benefits or savings derived from the government power.

This program will guarantee construction of necessary lines and systems at no cost to the taxpayers and will bring the greatest possible revenues to the government from power at federal projects. At the same time, the government can produce benefits in the form of navigation, flood control and reclamation.

The federal government and the private utilities can make reasonable contracts for the purchase and sale of power produced at federal projects, and each group then can coordinate its efforts and construction programs so that facilities will be available when needed. Such contracts could make effective all of the provisions of federal laws relating to public power. This will assure the people good service and will enable them to enjoy whatever benefits accrue from development of federal power at multiple-purpose projects.

Thinking people of America are asking, "Where is our government going?" It is time to set a definite course.



Simulated aerial photograph showing entire Big Creek development. New Big Creek 4 plant is shown at the lower left

EDISON RUSHES BIG CREEK HYDRO

HAVING barely completed a 280,000-kw. steam plant, Southern California Edison Co. has launched forth on another hydro plant in its Big Creek development. The new plant, to be known as Big Creek No. 4, will be the sixth in that utility's Big Creek-San Joaquin development. Located on the San Joaquin River some 40 miles northeast of Fresno, Calif., the plant will contain two 42,000-kw. units. The Bechtel Co. and Morrison-Knudsen, contractor for the Edison company, have nearly a thousand men working day and night to complete the $20,000,000 project by 1951.

General Description

The dam will be of a concrete gravity type with spillway gates. Length will be approximately 954 ft. and height above stream bed, 228 ft. The spillway crest is designed to pass a maximum flood flow of 100,000 cfs. Gates will be motor operated using a gasoline-driven generator for emergency stand by. The reservoir will have a gross capacity of approximately 35,000 acre-ft. and a usable capacity of 20,000 acre-ft. Approximately 465 acres will be flooded.

Water from the reservoir will be diverted through an intake structure in the dam, containing two 8 ft. x 17 ft. 5 in. vertical fixed wheel gates, into a steel pipe, having a diameter of 17 ft. connected to the tunnel through a reinforced concrete transition section. The tunnel will have a concrete paved invert and will be unlined except where the rock is not sound or self-supporting. Where required, tunnel will be fully lined with concrete providing a horseshoe section with a diameter of 17½ ft.

The conduit will consist of two sections of tunnel, 2,533 ft. and 8,100 ft. in length respectively, with 510 ft. of 15-ft. 6-in. diameter welded steel pipe on steel bents between tunnel portals at Willow Creek. A surge chamber and rock trap will be provided in tunnel section above the penstock connection.

The penstock from a point near the tunnel portal to a Y branch near the power house will consist of a single welded steel pipe 180 in. in diameter and approximately 607 ft. in length. From the Y branch the two lines to butterfly valves at the power house will be 9-ft. 9-in. diameter welded steel pipe, each approximately 188 ft. in length.

Mechanical Equipment

Suitable measuring devices for the determination of the amount of water flowing into and out of the proposed project will be provided by venturi meters at the power house, elevation recorders on the dam and stream gaging stations below the dam and at Willow Creek, and also at such other locations as may be determined at a later date. The inflow of water to the project from the San Joaquin River also may be determined from measurements taken at Big Creek No. 3 power house which is located on the San Joaquin River above the new project.

The power house will contain two Francis-type vertical-shaft hydraulic re-

Bulldozer building road to plant site. View also shows general character of San Joaquin River canyon. The Bechtel company and Morrison-Knudsen, contractor, are working day and night to complete the $20,000,000 project by 1951

Diversion bypasses river during dam construction. Dam 283 ft. high will divert water through two-mile tunnel

action turbines developing 57,500 hp. each under an effective head of 383 ft. at a speed of 240 r.p.m. The turbines will be direct connected to 42,000-kva., unity power factor, 60-cycle generators. Controls will be Woodward P.M.G.-driven actuators designed to have a minimum closing time of five seconds. A gantry crane will span the roof deck and hatchways will be provided for access to all equipment and to the repair area.

Electrical Equipment

The two generators will be rated, each at 42,000 kva., unity power factor, 11.5 kv., 60 cycles and will be Y connected. Generators will be totally enclosed, air cooled by means of heat exchangers. Fire protection will be provided by an automatic carbon dioxide system. The exciters and pilot exciters will be of the high-speed response type and direct connected to main generators. Voltage regulators of the conventional rheostatic type will be provided with design coordinated with that of generator and exciter.

Low-voltage switchgear will consist of three, 15-kv., 1,500,000-kva. breakers. The 15-kv. disconnecting switches will be manually gang operated. Switchgear and generator leads will be metal enclosed. The main power transformers will be located on a platform at rear of the power house and will consist of three single-phase, self-cooled, gas-sealed units with a fourth unit for a spare. Transformers will be rated at 28,000 kva. each, 11.5 kv. delta to 230 kv. Y, 60 cycle. High tension bushings will have a creepage distance of 200 in.

Station power supply will be provided by a bank of three 100-kva., 11,500 to 240-120-volt transformers connected to the 11.5-kv. leads of the main power bank by a 600-amp., 15-kv., oil circuit breaker. A stand-by station unit will be installed consisting of a 250-kva., 240-volt, turbine-driven house generator. The distribution line built to supply power during construction period will be retained for a stand-by source.

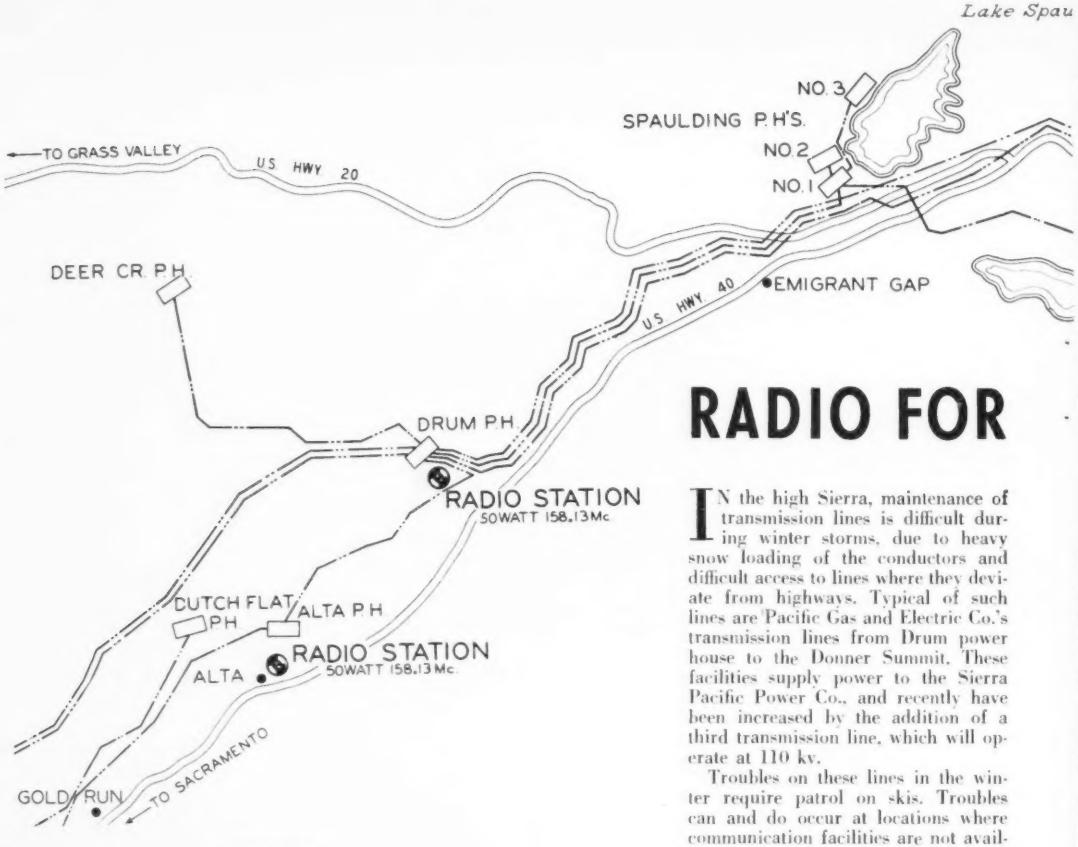
The station operating room will contain all controls for the main and auxiliary equipment, relays, graphic and indicating instruments. Controls will be provided to permit semiautomatic operation with no more than one operator at a time on duty. A standard Edison telephone and annunciator turret will be mounted on the operator's desk for Edison long distance lines and for power house and camp telephones. The station control battery will be 60-cell, 400 amp.-hour. The battery charger will be 7½-kw., 140-volt shunt-wound generator direct connected to a 240-volt motor.

Transmission Equipment

Power will be delivered from the transformer bank to a switch rack constructed of galvanized structural steel. The 230-kv. buses will be tension type ACSR cable suspended between steel dead ends. Suspension type 230-kv. coupling capacitors will be provided for carrier current relaying and communication, and for voltmeter and synchronizing potential. Switchgear will consist of two oil circuit breakers each rated at 230 kv., 800 amp., 3,500,000-kva. interrupting capacity. Bushings will have a creepage distance of 200 in. The disconnecting switches will be gang operated and will have a rating of 800 amp., 230 kv.

The transmission line will consist of a 220-kv. single circuit between Big Creek No. 4 switchrack and the switchyard at Big Creek No. 3. The line will be single circuit standard steel towers with 605,000 cir. mil., ACSR conductors provided with carrier current protective relays.

Other recent Big Creek work has been modernization of two existing plants.



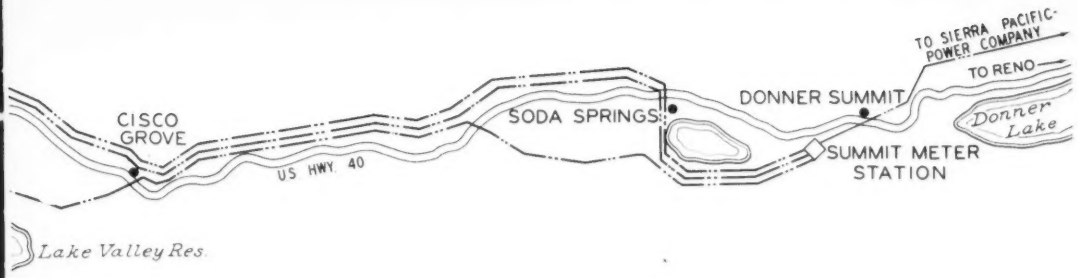
RADIO FOR

IN the high Sierra, maintenance of transmission lines is difficult during winter storms, due to heavy snow loading of the conductors and difficult access to lines where they deviate from highways. Typical of such lines are Pacific Gas and Electric Co.'s transmission lines from Drum power house to the Donner Summit. These facilities supply power to the Sierra Pacific Power Co., and recently have been increased by the addition of a third transmission line, which will operate at 110 kv.

Troubles on these lines in the winter require patrol on skis. Troubles can and do occur at locations where communication facilities are not available. These require additional travel by the patrolmen to get word to the supervisory personnel and repair crews to inform them as to the locations of troubles, necessary materials required for repairs and to obtain clearances on the lines. All such travel causes delays in effecting repairs and restoring service.

To reduce the time required for reestablishing service during transmission line troubles, good communication between patrolmen, repair crews, and dispatchers is necessary. In the case of the lines from Drum power house to Donner Summit, PG and E has recently engineered a radio system to meet these communications requirements. This radio system provides base stations at Drum power house, the source of power, and at Alta warehouse, headquarters of the maintenance crews. The accompanying map shows the location of these points and the route of the lines to the summit.

Patrolman uses radio pack set for constant communication with headquarters



TRANSMISSION MAINTENANCE

R. H. Miller
Pacific Gas and Electric Co.
San Francisco

In addition to the base stations, line trucks and service cars have been equipped with mobile radio sets, and portable pack sets have been provided for patrolmen. Use of this equipment makes it possible for patrolmen on skis to maintain contact with the base or mobile stations and immediately report the location of line troubles, and to give an estimate of the materials and crew needed to effect repairs. When the portable sets are out of the range of the base stations, information can be relayed through the mobile stations to order out the repair crews and to obtain clearances for work on lines.

Prior to the installation of this radio system, field tests were carried out to determine the most desirable location of the base stations and also to determine what coverage could be obtained in this mountainous area. Results of these tests indicated that the radio equipment would satisfy requirements. Further tests conducted after installation of permanent equipment showed better coverage than was anticipated.

All of the equipment operates on a frequency of 158.13 mc. The radio equipment for the station at Drum power house is installed in a small corrugated iron building located above the power house, near the penstock surge chamber. Equipment consists of frequency modulated transmitter - receiver with 50-watt transmitter output. The antenna is a vertical dipole installed on a 70-ft. pole. One of the accompanying photographs shows the transmitter building, which was mounted on pole stubs so that easy access to the building can be obtained when several feet of snow are on the ground. A remote control unit is provided for the power house operator and control of the radio equipment is obtained by an open wire telephone line.

At the Alta warehouse, a 50-watt mobile transmitter-receiver is used as a base station. This equipment is battery operated in order that operation of radio equipment will not be affected in the event of the loss of primary power at the warehouse. Normally, a rectifier is floated across the battery so that power for operation of the radio is taken from the rectifier and the battery supplies power only during emergencies.

Conventional mobile sets are installed in line trucks and service cars. The vehicles are all equipped with heavy-duty generators and batteries to supply the extra electrical load imposed by the use of the radio equipment.

Antenna pole and equipment shed for fixed station two-way FM radio system

Pack sets used by patrolmen are carried on the back similar to a knapsack, as shown. The equipment is powered with a small storage battery, which gives about eight hours service with a fully charged battery. To insure uninterrupted service, a second power pack is carried by the patrolmen. If the battery in the portable set is discharged beyond the point where satisfactory operation can be obtained, the second power pack can be substituted. The power packs can be conveniently changed, merely by operating two suitcase-type clasps and lifting the set off the discharged power pack and placing it on the charged pack. Polarized sockets are provided so that polarity of the battery cannot be reversed. The spare power packs are kept on a floating charge when the radio equipment is not in use so that fully charged batteries are always available when starting a patrol.

In operation the sets are convenient to use. A microphone is held in a clip on one of the carrying straps, and a small loud speaker and volume control are provided—mounted on one of the carrying straps. Range obtainable from the portable sets is entirely dependent on the terrain, but two or three miles seems consistent. In favorable locations satisfactory communication has been obtained over distances in excess of ten miles.

By providing mobility of communications for patrolmen and repair crews, it is anticipated that outages resulting from line troubles can be materially reduced, resulting in better service to the public and reduced time and expense in effecting repairs.

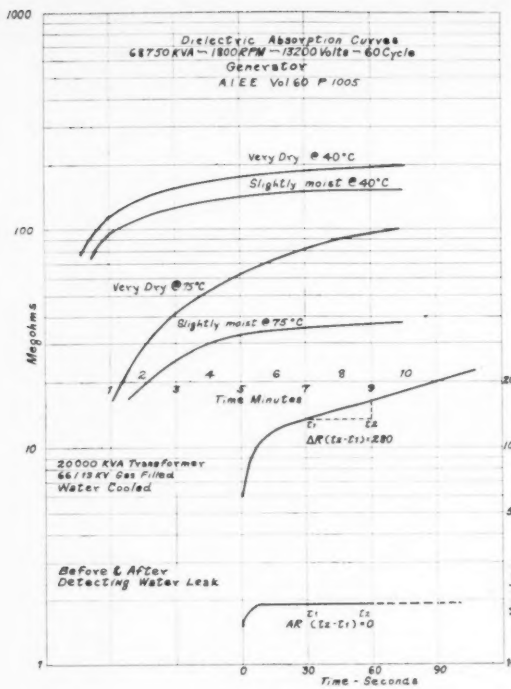


Fig. 1

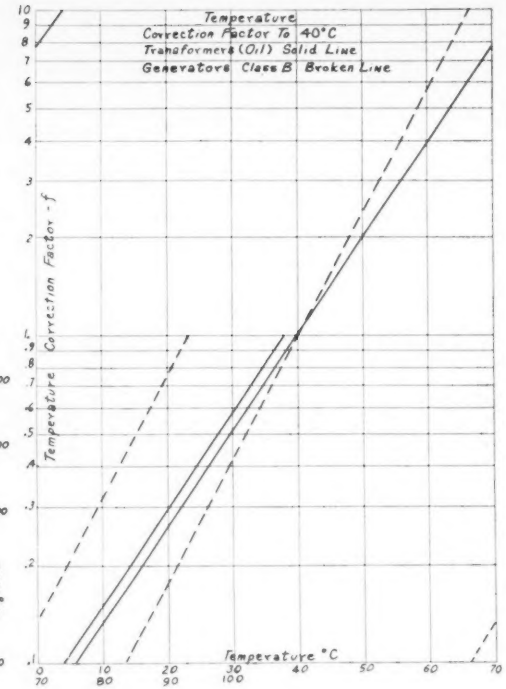


Fig. 2

PREVENTIVE MAINTENANCE — III

H. Burns Colby

Maintenance Engineer
Public Service Co. of Colorado, Denver

INVESTIGATIONS have shown the nature of electrification or charge effect and why an appreciable amount of time is required for built-up insulation to absorb test current from a d-c source, even though the voltage of the test current may be far below that at which the equipment under test is designed to operate. There are three components of the electrification or charge current, which are:

1. Capacitance charge, the first true charge, large in amount and of short duration.

2. Dielectric absorption, the second component, is the residual or absorbed charge which slowly diminishes in value at a rate depending on nature and amount of the dielectric, also called interfacial polarization.

3. Constant leakage, the third component, is the leakage through the dielectric which is considered to be the true insulation resistance.

It is the dielectric absorption current (2) which is useful in diagnosing insulation, because the shape of the dielectric - absorption current - time curve is influenced by the following factors:

1. Moisture in or over the insulation.
2. Nature or type of insulation.
3. Machine rating, voltage and speed.
4. Temperature of the insulation.
5. Cleanliness of the insulation.
6. Previous charges in the dielectric.
7. Test voltage value.

Test Equipment

1. Motor-driven megger, made by the James G. Biddle Co. in single-, double- and triple-voltage sets up to 10,000 megohms and 2,500 volts may be purchased.

2. Direct-current 1.0 kw., 15-kv., insulator tester with full-wave bridge-type rectifier and filtered output, using a 110-20,000-volt 2-kva. transformer, and four No. 866-A tubes, with a choke condenser (L-section filter) and instruments, may be built.

Test Procedure

1. Investigate the history of the generator with respect to:

a. Coil construction including nature of insulation materials and method used for control of corona in the slot and at the end turns.

b. Normal full-load copper and iron temperature rise, as found in manufacturers contract specifications and factory test data.

c. Previous failure record of the

generator or of similar generators.

d. Operating record with respect to overloads, over-voltage, frequent short circuits, exposure to moisture during idle periods, surges, and any other factors affecting condition of the insulation.

2. Make a thorough visual inspection of the condition of the exposed insulation for dirt, cracks, effect of corona on windings and metal parts of ventilating systems, and condition of blocks and cording.

3. Discharge the windings to be tested by grounding for at least ten minutes immediately prior to the test.

Make d-c insulation resistance-time curve (dielectric absorption) for a period of at least ten minutes. The test voltage on exciters and fields should not exceed 500 to 625 volts.

Fig. 1 shows some typical dielectric absorption curves and the greater slope of the dry generator insulation will be noted. The value where the curve flattens out is called the polarization index and is used for recording condition of the insulation. It is a recognized fact that the temperature coefficient of electrical insulation resistance is negative and numerically large, as shown by the broken line Fig. 2. This curve may be used to correct resistance readings to some standard temperature such as 40° C. The solid line is for transformers and the broken line is for generators, and has been reproduced from technical publication No. 21 T 4, which is temperature-resistance characteristics of electrical insulation prepared by the James G. Biddle Co.

The corrected value of insulation resistance is then plotted on semi-log curve paper as one point of a curve with resistance as the ordinate and time as the abscissa. Other adjusted points plotted on this curve will make an almost horizontal line. For example 6,400 megohms at 20° C. is the same as 200 megohms at 70° C. and both are equal to 1,600 megohms at 40° C. As long as this corrected resistance line remains flat there is no general change in the insulation.

The final value of resistance or polarization index must be above the minimum recommended AIEE value given by the formulae

$$R_1 = SKs^f \frac{E + 3,600}{\frac{Kva.}{30} + 200}$$

where R_1 is resistance after 1 minute at 500 volts.

S = machine speed constant, as follows:

R.p.m.	S
3,600	1.3
1,800	1.0
1,200	.9
600	.7
100	.4

Ks = insulation class constant

Class B = 1.0

Class A = 0.10

f = winding temperature constant by R. T. D.

Class B insulation

f	Degrees C.
1.0	75
2.6	50
6.9	25

Class A insulation

f	Degrees C.
1.0	75
6.9	50
47.0	25

For machines below 1,000 kva. capacity, the minimum insulation resistance is given by the formulae:

$$R_1 = \frac{E + 1000}{1000}$$

AIEE report No. 43 gives complete information on generator testing.

Dielectric absorption curves are also very useful in evaluating the quality of the insulation in transformers. Resistance-time tests are made in the same manner as on generators and the curve plotted should show dielecric absorption characteristics. The final value of a-c insulation resistance should be larger than the value given by the formulae:

$$R_1 = \frac{Kv. \times 30}{\sqrt{\frac{Kva.}{Cycles}}}$$

which is the minimum value for windings at 85° C. in air or 40° C. in oil. Also, in Fig. 1 will be noted from the two lower curves the difference between a dry and moist transformer winding. This method of rating by minimum value of ΔR $(t_2 - t_1)$ has been advanced by Blackway, insulating test engineer for Philadelphia Electric Co. The minimum value for a single-phase, two-winding transformer is 20 megohms, and for a three-phase, two winding transformer should be 10 megohms or over.

New Columbia River Transmission Span

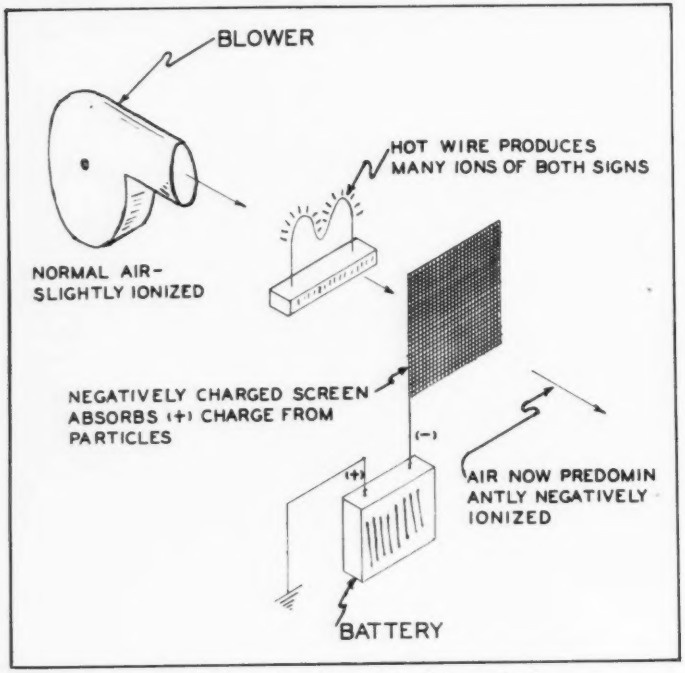
From this tower overlooking the Columbia River near Hood River, Ore., crews of the Pacific Power & Light Co. are stringing a new crossing span to provide greater ship clearance required by the War Department. The new 2,000-ft. crossing increased clearance over the ship channel to 160 ft., about 45 ft. more than provided by the former span. Towers supporting the conductors rise about 250 ft. above the water level on either bank of the river. Because of the difficulty of carrying a line straight across the stream, the old conductors were used as leaders to haul the new line into place under tension. Winch trucks supplied pulling and braking power.

Electrical West—Vol. 103, No. 6

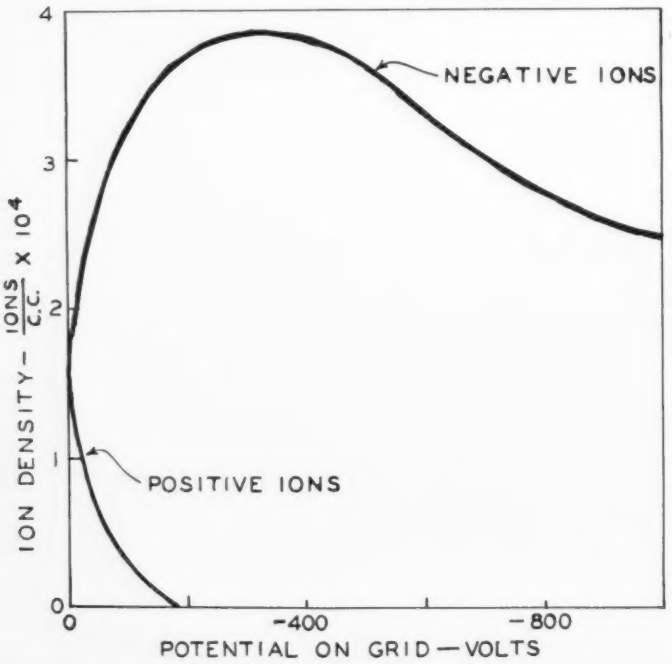
NEGATIVE IONS MAY HAVE HEALTH VALUE

J. C. Beckett

Wesix Electric Heater Co.
San Francisco



Below—Effect of charged grid on a hot platinum-wire ion source

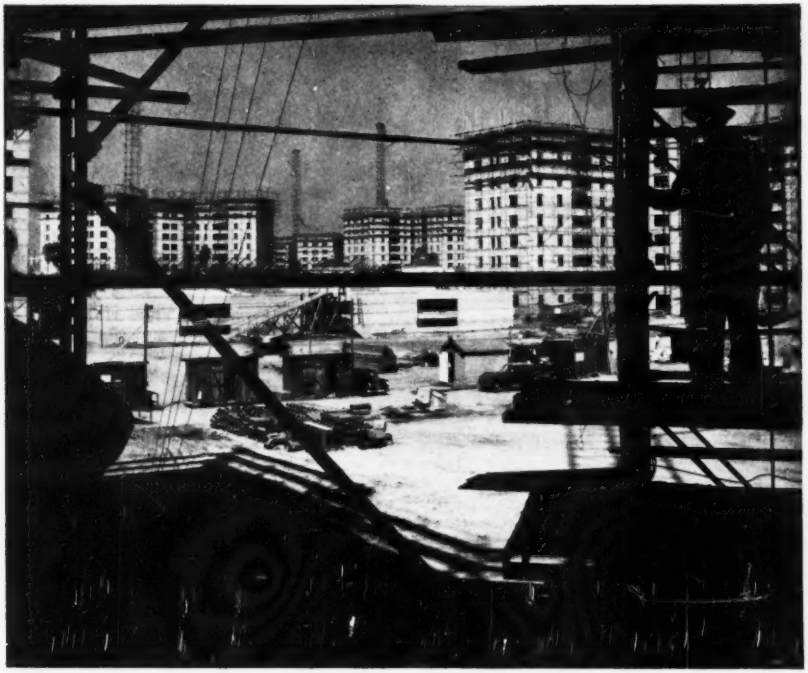


That negatively ionized air has a therapeutic effect on humans suffering from asthma, hay fever, high blood pressure, rheumatism, arthritis and perhaps nervous tension, has been suspected since 1930. Early tests were inconclusive. To produce negative ions artificially in quantity seemed to require equipment not available or that produced objectionable ozone and nitrous oxides. No hospital would consider providing clinical treatments for patients while there was no control of ozone, nitrous oxide or ion density.

Research studies sponsored by Wesix at Stanford University since 1939 have shown that ordinary Wesix radiant convection-type heaters generate quantities of negative and positive ions; nowhere nearly as great as an electric arc but nevertheless an effective number without ozone or nitrous oxides. Continued research at Stanford and by Wesix engineers has produced a simple means of screening out different ions and selecting negative ions for distribution in the room.

To date, more than 200 experimental Wesix "Ionix" and "Wexon" heaters have been in use. This work has been carried out with the cooperation of the medical profession. These Ionix and Wexon units are really large thermionic emitters arranged with negatively charged grid which filters out positive ions while negative ions are projected into the room, carried by the air passing through the machine. The charge on the grid is a low potential from a half-wave rectifier. Unlike the "Edison effect," the electron flow from the filament through the grid is in the open atmosphere. Control is opposite to the accustomed radio tube with the grid negative to pass negative ions. The Ionix heater, rated 1,000 watts or more, is appropriate for use in chilly weather. For use in summer, the Wexon is a 20-watt platinum alloy filament operating at approximately 2,500°F.

Wesix has appropriated funds for a negative ion study under medical supervision at Stanford University hospital for continuing research in this therapy. It is confidently hoped that continued research and clinical tests will substantiate early results here reported as to the therapeutic value of negative ions in alleviating some of man's ailments.



Parklabrea housing project has 18 apartment buildings 13 stories high and has seven garages

Jobsite Prefab Methods

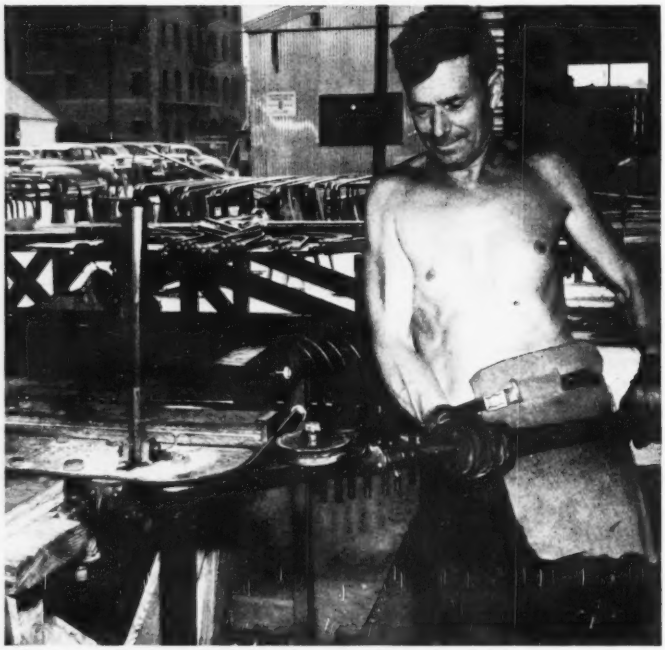
From warehouse and field shop at the project, materials are received; stored for quick assembly into lots for each wing of each floor, delivered quickly as ordered by area foreman. Material lists for bins and for standard floor layouts are mounted on boards as shown below

After apprentice removes thread protectors from black enameled conduit, rolls them to a rack where they are cut, eight at a time in two minutes, by a Wells band saw. Each typical floor requires 350 pieces of prefabricated conduit and 500 90° Ls. After cutting conduit is threaded

PREFABRICATION is often talked but few contractors have a chance to practice much of it. Yet from one such big job there may be ideas many contractors can apply to some of lesser size. California Electric Construction Co. of Los Angeles, of which J. B. Shamel is president and John J. Howard, vice-president, has such a chance in the $60,000,000 Metropolitan Insurance Co. Parklabrea project in Los Angeles, some of the features of which are illustrated here.

In this project of 18 13-story, four-winged apartment buildings (plus seven large garages), 216 floors are identical. Only the lobby of the first floor of each building changes a typical floor layout.

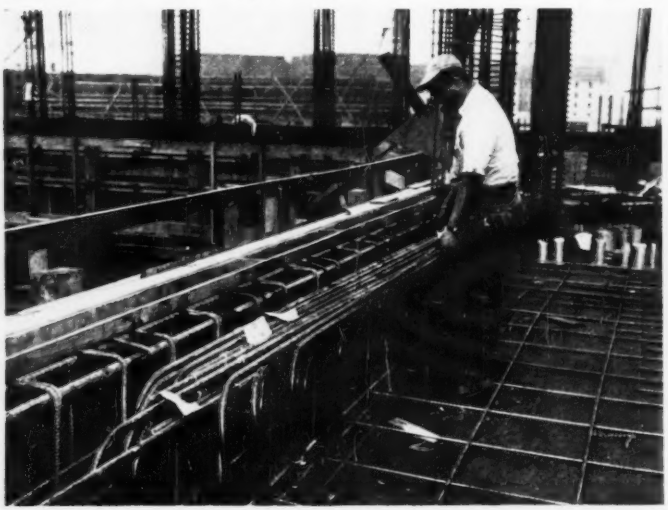
Hence a site shop and warehouse and four foremen's offices in trailers were set up in the area, connected by phone and served by a fleet of trucks and trailers. The complete job was standardized as to materials, conduit runs, panel and outlet locations, finish materials and equipment. Warehouse orders could thus be set up for typical areas and made up in advance of installation on a complete schedule. Conduit could be received, stripped, cut in bunches, cleaned, threaded by Quijada and Oster threaders, bent, and bundled in convenient quantities to install for each wing of each floor. In the prefab shop each saw, threader and bender operator has a typical deck list before him. The shop makes each floor to order. Each threader is set to handle a given size conduit, never changed. The same with benders. All bends are standard 90° Ls, and a standard 3-in. allowance is made for each bend.



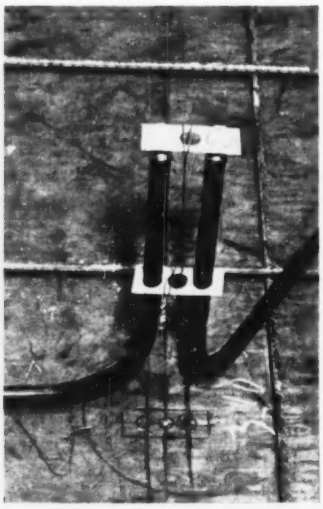
After threading by machine, conduit bends and Ls are made in the field shop on a production-line basis, then stacked on racks ready for bundling and delivery

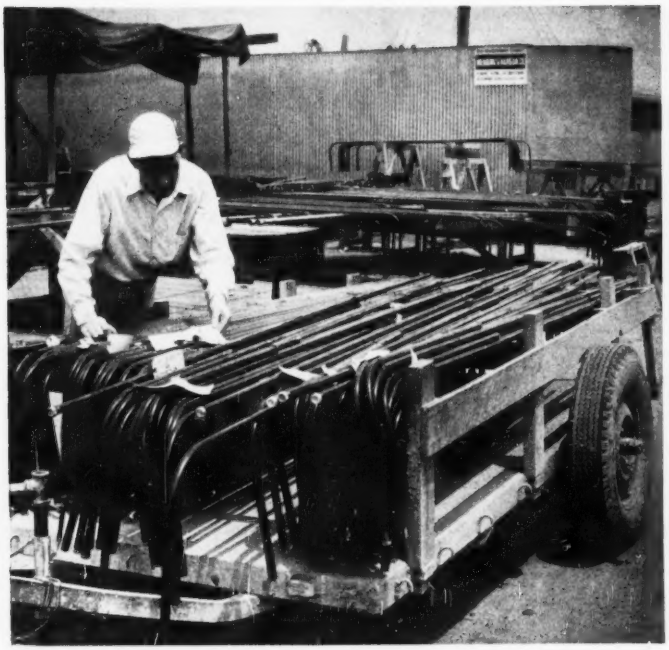
Steps in preparation of conduit are about as follows: An apprentice assembles the number of conduits of the sizes needed for a typical deck, moving them from the storage piles to the racks in the prefab shop yard. He removes the coupling from one end and the thread protector from the other. Conduits stripped, they roll down the rack to the metal-cutting Wells band saw, electrically driven. The sawer cuts

Bundle of conduit for each wing of a typical building is held temporarily on removable hooks at one wall, picked up and installed by deck crew as needed



Layout crew has marked riser locations on deck. Note spacers to hold conduit





Two trailer loads of precut, prethreaded, prebent conduit like this are assembled and delivered for each typical deck. All are bundled and tagged also

eight at a time in two minutes. He numbers one pipe in the stack of eight according to where this set goes into the typical deck schedule.

After sawing, the conduit moves to two Quijada pipe threading machines. Two are required to keep up with the saw. A standard ½-in. pipe thread is put on in eight seconds. After threading the conduit is stacked on racks. A paper seal and bushing is put on conduit ends as a means of protecting them against clogging with concrete.

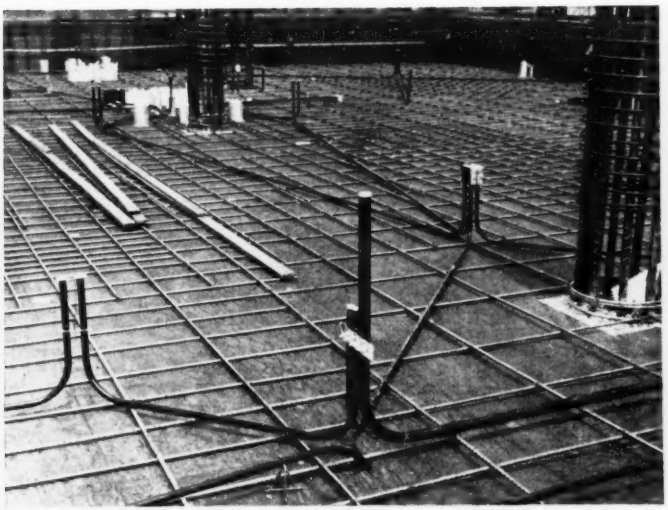
Next the conduit is bent by two men at T&B and Chicago benders set up for one size of conduit. After bending the conduit goes to an apprentice who assembles the pieces to make up a typical floor. A packer then gathers all pieces needed for a production run, tags each bundle as to location and deck, places these on a trailer and they are delivered to the site.

When a complete deck's conduit has been delivered to the site by truck and trailer (two loads), a crane hoists the entire prefab component to the working deck where the installation crew installs it. Bundles for each wing are held on steel books placed over the edge of the wall reinforcing.

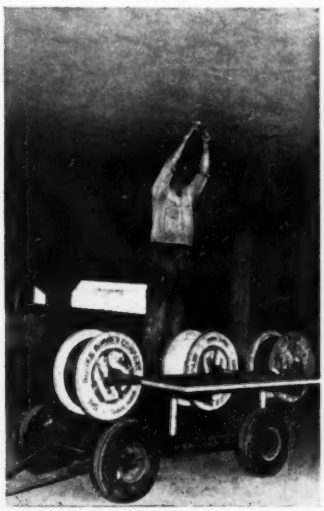
Men needed in the prefab shop are: One man on the saw, two on threaders, two line benders for ½-in. conduit, one on 1-in. and ¾-in., two bucking up or assembly, two packers or bundlers, one stripper and trailer loader, one delivery. Superintendent Murray says, "We prefabricate about 99% of floor-to-floor installation, which is about as close to perfect as you can come." The 12-man crew turns out conduit for two floors each day.

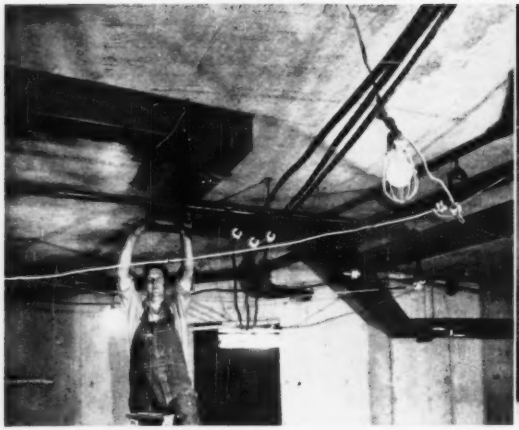
Not shown here is another shop in one end of the site warehouse where angle iron is prefabed for panel supports, larger pipe is cut and bent and similar work done. The warehouse itself is completely organized to stock materials that are used together in bins arranged for fast assembly of the quantities needed for each wing of each deck. These are put in locked boxes and delivered to the various buildings

Conduit runs in place for one wing. Note spacers to hold risers in place. At bottom note the heavy wire saddle prefabed to hold conduit above reinforcing



Cable reel dolly used in pulling wire in the seven large garage buildings





Wireways along basement ceiling are used for power conductors. Note the split-spool temporary wiring used

Main panels and meters for each apartment building are in Square D standard equipment as shown here

as scheduled. The materials are kept under lock during the night to assure no interference with the standard package for each deck.

At first, layout was tried with each installation crew, but it was soon found that one specialized layout crew could get more uniformity of layout and speed standardization.

Four typical schedules were developed and these cover the complete list of materials and fittings for the apartments, the lobby floors, the basements and the garages, including all special equipment or runs. From a standpoint of electrical equipment the apartments are nothing exceptional, having an average installation of outlets and lights, no electric ranges or water heaters, only a bathroom heater. But the size of the entire project makes it outstanding.

Purchasing for the project was also done en mass—850,000 ft. of ½-in. black enameled conduit; 200,000 ft. of ¾; 50,000 ft. of galvanized ½-in.;

135,000 ft. of 1-in. galvanized and black; mostly National and Buckeye makes, shipped by water and trucked to the site. The prefab shop stocks 350,000 ft. of conduit, a carload to a pile. Wire is shipped on 5,000-ft. spools instead of 500-ft. There will be 3,691,500 ft. of wire used in the project.

Wire pulling will be standardized also with special crews handling it. Dollies or trucks to hold the cable reels are used to facilitate the operation. A heavy four-wheeled trailer with a platform the right height for the wiremen to stand on and reach ceiling outlets has been used in the seven two-deck garage buildings.

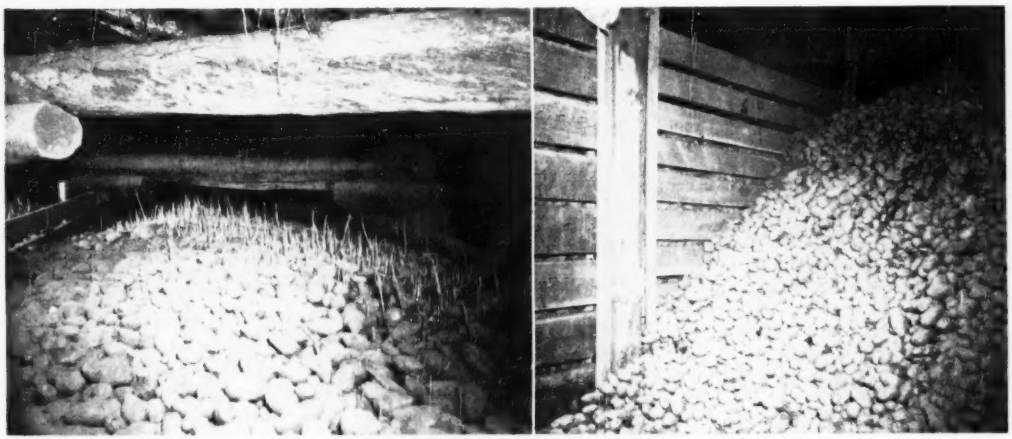
When finished, by September 1950 it is scheduled, the 18 apartment buildings will each contain 153 one- or two-bedroom apartments, two elevators, a spare elevator stall.

Above, John J. Howard, vice-president and James Murray, superintendent. Below the foreman staff in front of a field trailer office: Crew foremen: Ike Marrow, Mark Woulfe, Jim Saxton; Clyde Peterson, layout foreman; Rudy Lissner, Fred Phair, Alex Saltzman; Jack Thomas, warehouse foreman; Jim Murray, superintendent and Harry Jacobs, shop and prefab foreman. Trailer offices are connected by phone with the shop and the warehouse

NORTHWEST ELECTRIC LIGHT AND POWER ASSOCIATION

Utilization Data Sheet No. 62

SUBJECT: Air Conditioned Potato Storage Cellar
CUSTOMER: Thomas Vanderford
TYPE OF OPERATION: Potato Grower and Dealer
SERVICE COMPANY: Idaho Power Co.
DATA PREPARED BY: S. C. Rhoads, Division Sales Manager



In non-air-conditioned cellar (at left above) potatoes near the outside wall have sprouted excessively. In air-conditioned room at right potatoes are crisp and show a minimum of sprouting

To avoid having to market his potato crop at the same time as other farmers, Thomas Vanderford provided controlled ventilation for his storage bins that would maintain the potatoes in good quality with a minimum of shrinkage for a longer time than would be possible under natural conditions.

Potatoes in storage live, and therefore, use oxygen, give off moisture, heat and carbon dioxide, much the same as human beings. These processes are more rapid at high than at lower temperatures.

An economical solution to the problem of keeping the potatoes in good condition for longer than possible under normal conditions was found in the installation of an air conditioning system that would circulate air through the potatoes in storage. Cool night air is introduced as the cooling medium during fall, winter and early spring. Normal temperature of the area is such that no mechanical refrigeration is needed from Nov. 1 to May 1.

Description of Installation

The cellar is 300 ft. long and 110 ft. wide, with 44 storage bins, each having a capacity of 2,200 100-lb. sacks. Two 15-hp. motors and fans are installed in one large duct running down the center of the cellar with branch ducts into each bin. Automatic dampers control the recirculation of air and the introduction of outside air. A room thermostat controls the dampers so that air below 30°F. is not circulated and outside air over 36° is not admitted. The two motors together move 26,940 cu. ft. of air per minute with a maximum demand input of 29.2 kw. From December to May the kilowatt-hour use was as follows:

Month	Kwh.
December	16,320
January	18,920
February	16,040
March	9,680
April	3,870
May	3,030
Total	67,860

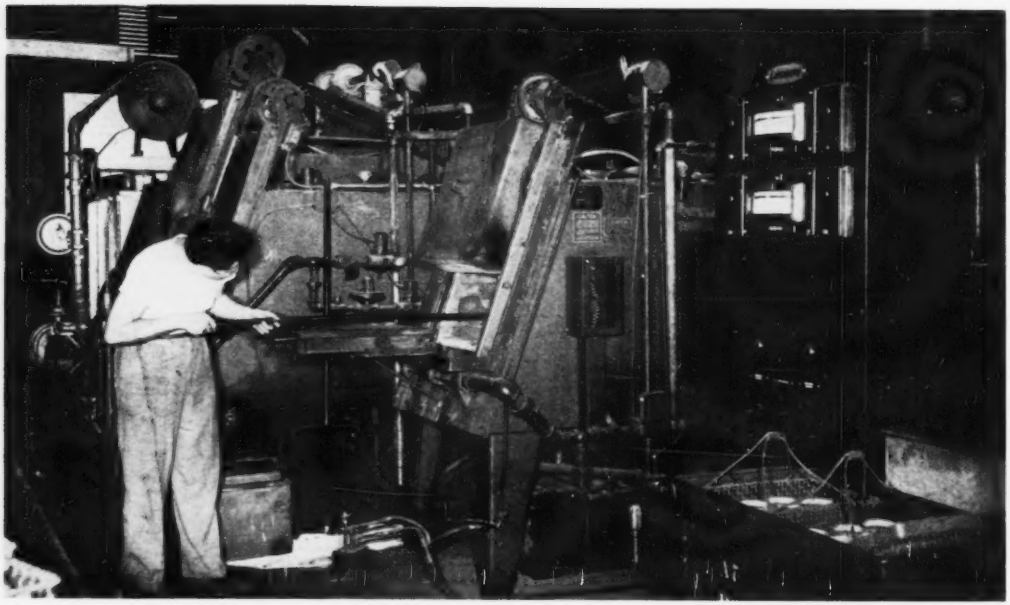
Advantages to Customer

Vanderford has stated: "This air conditioning takes the excess moisture and heat out of the potatoes, especially when they are bulked in large lots. We plan to install the system in nearly all our houses, so as to have more potatoes with which to take advantage of better markets." Other advantages:

1. Uniform temperature maintained throughout the potato pile.
2. Less shrinkage due to spoilage.
3. Less sprouting.

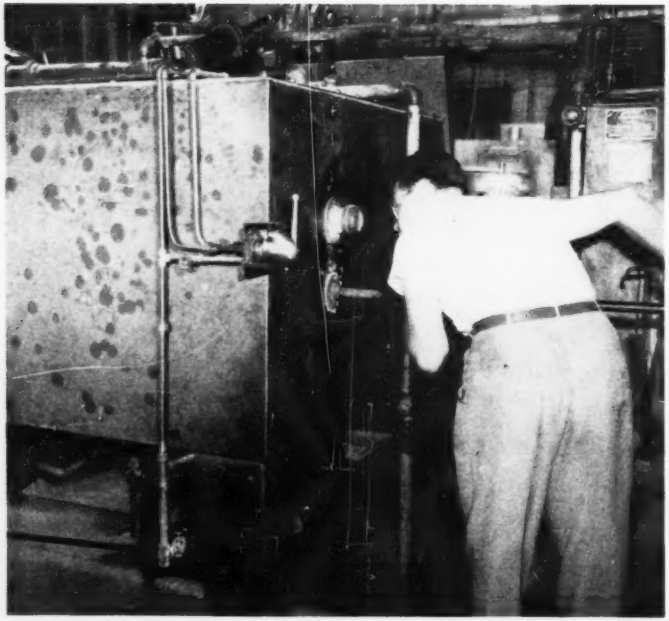
Operating Data

Tons of potatoes stored	4,840
Kwh. used	67,860
Kw. demand	29.2
Normal annual temp.	44.5° F.
Storage period	Nov. 1 to May 1



UNIQUE HEAT-TREATING FURNACE

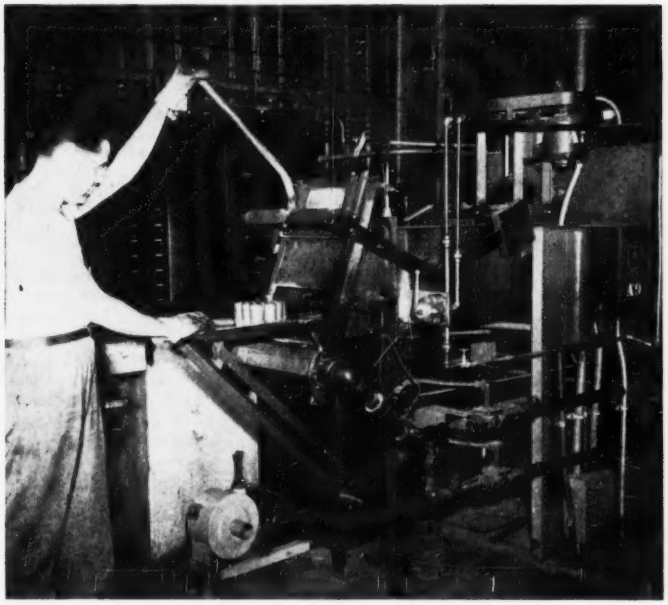
L. B. Reed
Los Angeles Department of Water & Power



THE newest thing in a high-temperature heat-treating furnace is a 2,500° controlled atmosphere electric furnace installed by the Lindberg Steel Treating Co. of Los Angeles. This concern, with plants in Chicago and St. Louis, is set up to make any standard heat-treating application. The furnace was developed by Lindberg Engineering Co. for a new precision method for bright hardening of high-speed tool steels. The molybdenum, 18-4-1, 18-4-2, or cobalt-type high-speed steels can be hardened virtually bright and totally free from decarburization or carburization. It is particularly designed to harden precision high-speed tools, such as cutters, thread chasers, etc., that have fine cutting edges and cannot be ground or cleaned after hardening. A protective atmosphere is utilized and is kept under perfect control for the entire operation.

The furnace consists of preheat,

Loading end of furnace showing preheat chamber (above). High-heat chamber (below) operates at 2,500° F. Trays being moved to cooling chamber



Removing work upon completion of cooling cycle. Atmosphere in furnace is protected by flame curtain at doors

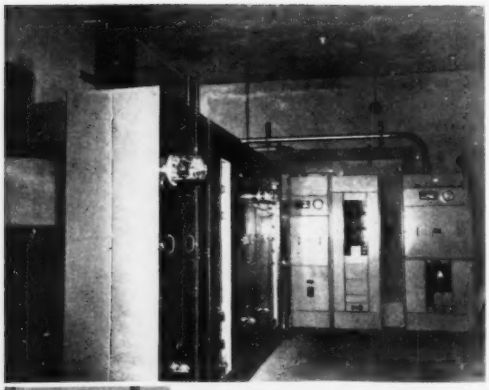
high-heat, and quench, all built into one complete unit, and arranged in L formation. The preheat chamber forms one side of the L and the high-heat and cooling chambers, the other side. The work is placed in the preheat chamber and heated to 1,400° to 1,700° F. by use of 15 kw. of standard nichrome rod units. After preheating, the work is pushed into the high-heat chamber, which is heated by 30 kw. of globar units, then into the water-jacketed quench chamber. The quench unit is designed to quench the steel by means of forced convection, cooled protective atmosphere. Sections of high-speed steel up to 2 in. can be fully hardened by the atmosphere quench. Since the steel does not contact the air until after preheating, hardening and quenching is completed, bright results, totally free from decarburization or carburization, can be obtained. The atmosphere is provided by a separate Lindberg Hyen (endothermic) atmosphere generator.

This is the second furnace of this type to be built by Lindberg Engineering, the first having proved itself at the St. Louis plant. While primarily developed for heat-treating high-speed tool steels, it may be used for heat-treating air-hardening-type tool steels, copper brazing, bright annealing, and all other ordinary heat-treating. Some advantages claimed in the heat-treating of high-speed tool steels, in addition to superiority of products, are high productivity, more comfortable and better working conditions for operators, lower maintenance costs, more flexible operating characteristics and the elimination of cleaning operations after the heat-treating has been done.

According to the Lindberg people, the factors that prevented full control of protective atmosphere in the conventional separate preheat and high-heat furnaces in the past were: (1) Scaling of the work when removed from the preheat into air and transferred to the high heat. The subsequent reduction of the scale in the high-heat furnace resulted in decarburization. (2) Contamination of the high-heat atmosphere when opening the charging door. (3) Scaling and slightly decarburizing the steel when removing from the furnace through the air to the quench. All of these factors are eliminated in the new Lindberg furnace because the work enters the furnace cold and does not contact air again until it is completely hardened and cold.

Mechanized Car Icing

A push-button, mobile machine that will crush five tons of ice an hour and pour it into the bunkers of a refrigerator car in less than 90 seconds has completely mechanized car icing for the Santa Fe Railway Co. at its Bakersfield, Calif., plant. The machine, here shown, utilizes electronic principles of operation. The entire machine is push-button controlled by an operator on a bridge of the machine. Power for six motors is furnished by 440-volt trolley wires beneath the dock. These wires are hazard-proofed by a new type of protective covering known as "Calabar." Trolley wires also serve as carrier for high-frequency current that operates radio controls as well as an FM radio system over which all icing operations are controlled.



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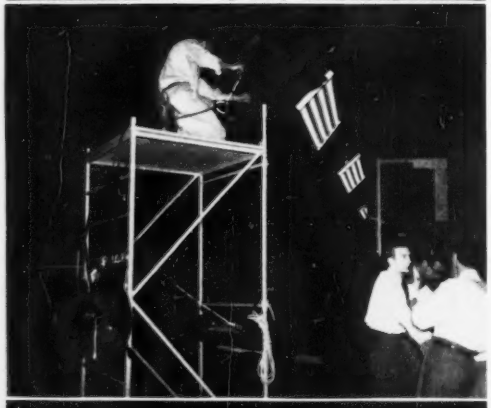

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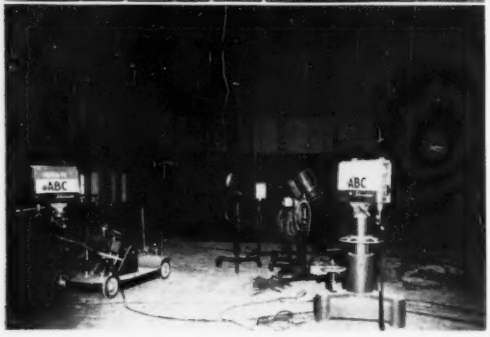


4.

FROM SILENTS

ABC modernizes pioneer studio

APPROPRIATELY ABC has selected as its Hollywood Television Center the site of one of the pioneer moving picture centers, the old Vitagraph studios on a 23-acre area at Talmadge and Prospect St. Rich in history of silent movies and stars from 1912 to 1926 it was here also that the first successful sound picture, *The Jazz Singer*, starring Al Jolson, was filmed. But aside from all this historical background, selection of this large movie lot was far sighted as a television production center. It had two huge sound stages, one claimed as the world's largest sound stage and containing at one end a full-scale theater and stage for audience shows. Stage 2, it is called, is 175 x 200 ft., with a 90-ft. ceiling. Stage 1 itself is capable of setting up a dozen sets in a semi-circle for use in televising a story requiring that many.

Of interest electrically is the conversion of the facilities for movie producton to those now for television. According to Cameron G. Pierce, supervisor of TV operations for KECA-TV, the Los Angeles American Broadcasting Co. station which operates from the TV Center, the major change was to bring in alternating current to replace the old direct-current system. For this changeover Fishbach and Moore, electrical engineers and contractors, handled the job.

All old d-c equipment was removed. A new service from the utility at 34.5 kv. is brought in underground to a transformer vault back of stage 2. Here the three phases are stepped down to 120/240, two phases of which are used for stage and one for office lighting. Another three-phase, delta service is used to power the rotating equipment such as fans, blowers, motors and machinery. Because the electronic equipment is sensitive to voltage changes a separate regulated source at 4,400 volts is brought to pole top transformers and stepped down to 110/220 for supply to such equipment. There is 150 kva. of capacity for this purpose. From the main power source previously mentioned total capacity is 800 amp. Existing feeders to the stages were found sufficient and were used. A new main switchboard (Fig. 1) was installed adjacent to the transformer vault in what had been the motor-generator room. Made by Zinsco, the board has breakers for phases A and B which go to "bull switches" for stage lighting, and phase C for general lighting. At the end is the three-phase power panel and next to it the main panel for the regulated single phase that goes to electronic equipment.

Improved picture tubes in TV cameras do not require the light intensity originally needed, hence the lighting of scenes is simplified even over movie making. Cameras can photograph satisfactorily scenes lighted at an average of 60 to 100 foot-candles.

The "bull switch," really a 600-amp. externally operated switch, is used only as a fused disconnect at the stage. It feeds to a Kleigle plugging panel containing six 100-amp. circuit breakers and six receptacles for

TO TELEVISION

to make Western TV Center

heavy stage plugs. By means of stage cable feed is taken to portable control boards that are used near the stage sets to distribute to lighting equipment on the set. These portable Kleigle boards also contain autotransformer type dimmers for control of lights. Fig. 2 shows Cameron Pierce in front of an opened "bull switch," hands at one of the plug board controls. A portable control board is seen at right.

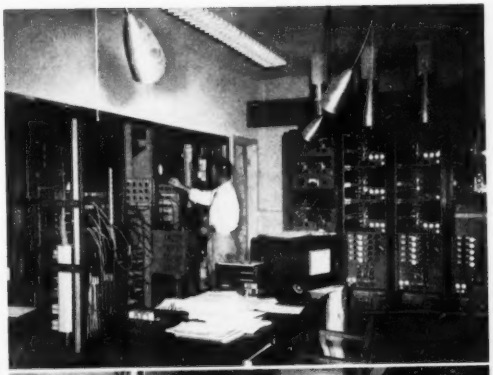
Lighting equipment used, some of which is illustrated in Fig. 3 and 4, is standard stage spots in sizes up to 2 kw., using incandescent projection lamps. Other incandescent sources used are called "broads" and are flood lights. Fluorescent units, using four 8-ft. slimline tubes, operating at 600 ma. are used like borders or even foot lights. Fig. 3 shows some of these, as well as portable platforms used to mount and operate spots. To the battens above the stage where lighting equipment is suspended, multiple cables of 12 No. 12 conductors feed from the control boards to a gutter from which "pigtails" distribute to the lamps on the battens. Fig. 4 shows both a fixed and a portable TV camera and lighting spots on the stage of the theater inside stage 2.

An electronic center is the main control house, to which all coaxial cables between stages and control center terminate the multitude of circuits on terminal strips. Six two-inch conduits were already in place between the stages with their own control rooms and the master control house. They had been used in the old Vitaphone studios. The control room at each of the stages was enlarged and a sound control room added. Fig. 6 shows one of the new control rooms, the dark plate glass giving operators and directors a full view of the stages as well as a program console which allows simultaneous view of pictures from each of several cameras used on the set.

Fig. 5 shows a portion of the main control center before completion. All programs, whether from the stages or the field trucks or from films projected onto RCA television cameras (Fig. 8) are channeled through the main center, either to the transmitter, located on Mt. Wilson, or to the networks, through telephone company facilities.

In an adjoining room are the Kinescope recorders, Fig. 7, which photograph on film the TV program direct from small television tubes. Such films are processed and prints sent to stations not connected as yet by networks. In another room the projectors for standard 35 and 16 mm. films (Fig. 8) are housed, with balopticons to project titles and still pictures into television cameras, film projectors and other similar special equipment. Not shown on a wall above at left are mounted several TV screens which show operators how the program looks, allow them to fade in and out the titles, still pictures, movies, etc.

Standard broadcast practice is followed in the installation of the electronic equipment panels. The a-c supply comes in at the top from gutters and the video and sound output through gutters out the bottom of the panels.



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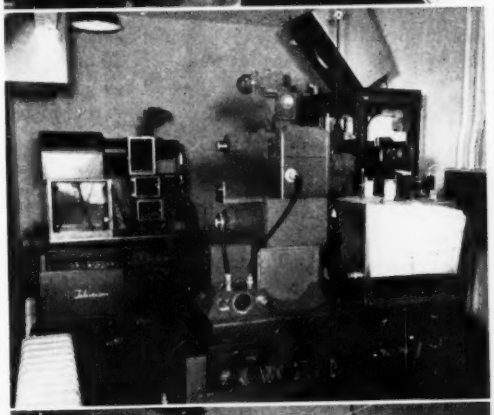

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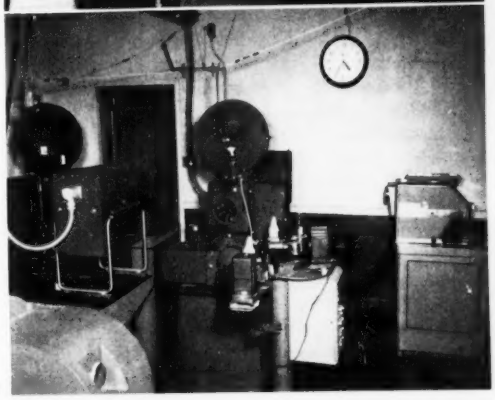


8.

ELECTRICAL WEST

Make More Capitalists

A VERY practical-minded college professor friend insists that one sure way to avert conversion of America into a security state is to produce more capitalists. He believes, and we agree, that steps which will make it easier for the public to buy and own securities, to own real estate and otherwise to invest in our American economic system, are desirable and necessary. To that end the efforts being made by investment houses to familiarize farmers with stock and bond ownership and the investment classes being conducted for housewives are excellent. However, the recent programs initiated by some utility companies to sell securities to their employees once again come closer to accomplishing the job. Pacific Gas and Electric Company is one of a few utilities having highly successful plans whereby employees may become stockholders. If more companies will follow suit, they will help to build a swelling rank of free enterprises to combat socialism.

Where Credit is Due

CONSCIENTIOUS and hard working chapter managers and the Western field director of National Electrical Contractors Assn. have felt hurt by the critical comments herein that were never intended for them. The aim was over their heads. It was directed at an old hierarchy which for many years had fixed policy and negated the hard work and zealous effort put forth by these chapter managers and field men. The latter have sought to make the association what it was intended to be, a local contractors' organization, banded together nationally to solve some of the difficulties that national trends have visited upon them.

While the last month's comment was at the printers the members of the NECA themselves were taking action to remedy a situation of which so many had complained for years. The large number of new members from the middle West, from Texas and the Far West, with a record breaking attendance at the Houston convention, voted some changes that promise to bring the association into closer response to the needs of its average members, less to the policies of the New York and Chicago big "gypsies." A man from upstate New York was named president, a "dark horse" from an Indiana town swept the hitherto influential Chicago vice-president out of office and the amendment to reduce the dues of big operators and raise those of small contractors was badly defeated. Furthermore there was initiated a program to bring to NECA members new benefits in the way of practical business education.

More than just to make amends to the Westerners who have worked so hard and so conscientiously to improve their NECA chapters but rather to summarize a year's exceptional activity, it has been intended by the editors to report the details and scope of this constructive work. This shall be done soon. It is overdue now. May it show that this publication has not ever been hostile to the contractors of the West or to their associations, rather it has sought to help them in a situation which is now being remedied by an aroused membership.

There has been much progress in these chapters in the past year or so, many activities outside of labor negotiations directed at improving contractors' standing and protecting their interests. This story shall be told.

May the improved outlook since the convention at Houston assist these conscientious workers to win back to their association many important contractors who may have been waiting for this change to take place.

Supporters of Freedom

SO LONG as there are forthright and inquisitive organizations like the National Reclamation Association here in the West, there is assurance that the extravagances and the duplicity of the bureaucrats will ever be questioned. This was evident at the recent NRA Salt Lake convention. With the same pioneering spirit that led their forebears to look behind every tree for a Redskin, these modern defenders of personal freedom and seekers after opportunity look askance at all of the so-called "good things" which come out of Washington.

EDITORIAL VIEWS

The presidential address of Harry E. Polk bristled with pointed barbs aimed at the federal distributors of largesse. But even more to the point was President Polk's questioning of the whole federal policy. Among other things he said:

"I am old-fashioned enough to believe that there is something constitutionally wrong in a situation in which the federal government can come into any area, build dams, flood productive lands to provide protection for downstream states, generate power at those dams, and then tell any state that the major portion of that power will go to preferred public power agencies in other states unless the state is willing to go public power. This situation is confronting a number of Missouri Basin and other Western states, and I think something ought to be done about it — something that is fair and reasonable."

President Polk went further than many previous critics of this federal power policy. He offered this possible solution:

"The power and energy generated at Hoover Dam is apportioned among several nearby states. Why not have something similar at other federal projects out West? There's an equitable apportionment doctrine that governs the division of river water between states. Why not apportion similarly the power generated by those rivers?"

There are plenty of Westerners who would wholeheartedly support such a proposal were it to come before Congress.

Tell Your Story in Movies

HOLLYWOOD movie trade gossip now says that most of the feature films of the future will be in color. Color boosts box office receipts two or three times over black and white. Power company advertising and publicity departments here in the West are aware of that audience preference. In recent months some spectacular and beautiful motion pictures have been produced depicting features of utility territories and systems. Not only have these pictures been especially interesting to local audiences, but they have helped sell the companies to Easterners who will participate in underwriting securities in these companies. Most Western power companies are actively engaged in financing their huge construction programs. Color pictures tell a potent story of the diversity and soundness of the economy in the territories these companies serve. The possibilities of this medium are far from exhausted and many other companies can profit from the experience of those who are using it successfully.

THE day of decision is upon us. We must now begin to retrace our way to that place where we missed the road to our destiny. We do not belong on this road to serfdom that leads to a land wherein men sell their souls for what they call security, but which turns out to be a nightmare in which man is a lost soul without a home. Instead, we belong to a land of those who have learned that, where the spirit of the Lord is, there is also liberty. Let us determine that we shall not allow the state to be our master, but that we shall be the masters of the state. The long road of history is lined with the ruins of those states which bought the souls and the wills of their peoples by the lure of a granted security, and then led them to ruin by that same mirage. The world does not need one more such ruin. It needs, for the first time in all the twenty-four civilizations, a people who will be really secure and enduring, as far as mortal life is possible —secure and enduring because each member of the society is a person who accepts his or her responsibilities as duties, and asks only that the state act to keep the avenues of freedom open. That will come, not by copying the ruins of the past, but by a free people rising to meet the challenge of a free society, putting their trust in freedom because their faith is in God.—Dr. Russell J. Clinchy, minister, First Church of Christ, Hartford, Conn.

Borda Shreve

Bailey Sanders

Fort

More Groups, Work and People at PCEA

FRESNO is just going to have to grow more hotels. For each year the Pacific Coast Electrical Assn. annual fall conference grows bigger and better. With a registration of 587 the one-and-one-half-day meeting, Nov. 17-18, seemed to pack more vitamins per minute into more committees and subjects by more participants than has ever happened before. It was a working session, not a convention in any sense. After President I. W. Borda had gathered the entire attendance into one big general meeting, Thursday morning, at Hardy Theater, he dismissed the participants to meet in 21 separate parallel groups that afternoon and next morning. What they discussed, decided and did in those meetings is reported in brief in the following, each under its committee or group designation.

Even the general session program and that of the single noon luncheon, Thursday, was devoted to working data —on salesmanship, personnel and conservation of resources. President Borda set a keynote by urging all to jump into the discussions with "all four feet." Spraying of each other with perfume, he said, would get the industry nowhere. Frank and clear discussion of the difficulties besetting the industry would build the health of the industry to ward off the germs that beset it. Among the ills that threaten he enumerated spreading of gossip and rumor, cutting of prices, special laws and programs that may be of advantage to a few but detrimental to many. In all it was a strong case he made for industry mindedness. "What hurts any one is bad for us all."

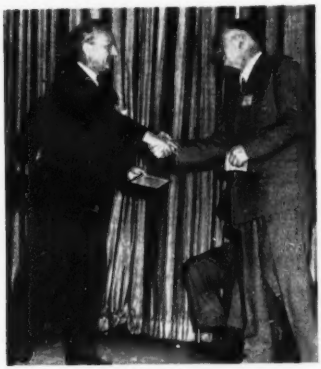
Milton Sanders, past president, now assistant to the president, Leo J. Meyberg Co., with cartoons and humor, kidded the popular notion as to where salesmen came from and then illustrated that "your dependence on salesmen is terrific." He depicted Christopher Columbus as a salesman who sold a housewife a bill of goods and discovered America; Sir Walter Raleigh as a salesman who sold the colonization of America; John Adams as the man who sold the Declaration of Independence to the Continental Congress. Then a picture of an ordinary salesman —and it was he who sold the first electric iron, the first automobile, the first airplane, etc. (A blank page illustrated the utility salesman, "he doesn't exist anymore," said Sanders.)

Then Sanders told how selling used to be done in the "Dark Ages" (dark because one does not see it anymore). There were sales contests, quotas, prospects, cold turkey. Where get salesmen? "Some advertise, some whistle, some wait." None of these gets good salesmen, said he. "Let's go out into the field of young men in high schools and colleges. Let's tell them something about selling as an occupation and what selling offers to them." If the planting of such seeds brings up a crop, the likely ones can be nurtured and fertilized. If the dealer cannot afford this training program, he advocated industry sales schools under PCEA leadership, conducted at the local level with the help of utilities, manufacturers, distributors, dealers.

Less spectacular but eagerly sought was the talk given by A. R. Bailey, vice-president in charge of operations, Coast Counties Gas & Electric Co. By listing the functions of the personnel department he indicated at which points the foremen and line supervisors of any company should work closely with the personnel department. He said that personnel departments are relatively new in industrial organizations but now an essential part of administration. The line staff used to carry many of its jobs in the old days, but now either tends to feel it is not wanted in personnel activity or it sloughs off on the personnel department many of its own responsibilities.

Bailey then broke down the functions in recruitment, selection and placement, orientation, training, rating and evaluation, wage and salary administration, employee relations, labor relations and statistics and research. In almost all but the last the line supervisors have a part or can cooperate to produce better results.

Ben Moses, retiring after 20 years as secretary of the California Committee on the Relation of Electricity to Agriculture, was paid a sincere tribute by George C. Tenney, editor, ELECTRICAL WEST, who presented Moses a framed plaque expressing the appreciation of the association and the industry for his outstanding work. "If all regions had been as successful in developing agricultural uses of electricity, there would never have been a need for a governmental agency such as REA," said Tenney, who declared California farms use five times as much as the farms of any other state, one-third of all the agricultural power in the nation. He



Tenney Moses

credited to Moses and the university staff a large measure of assistance to make such a record possible.

Not scheduled, but found attending the conference, E. O. Shreve, retired vice-president, General Electric Co., now heading Junior Achievement Inc., was asked to speak. Almost passionately Shreve told of the spread of totalitarianism and how it is being hastened by Congress reaching into the public treasury for all sorts of projects. In effect, said he, this is stealing the savings of the public and loading the future generations with huge debts (with presently approved contingent liabilities, plus the public debt, each man, woman and child carries a $3,000 share of debt now.) Shreve then described the educational program of Junior Achievement, by which groups of students are given practical experience in setting up a business corporation and operating it.

Conservation of natural resources should be dictated by economic necessity and guided by technical ingenuity but not be used as a "sugar coating to cover any kind of crackpot economical idea," Tom Fort, manager of apparatus sales, Westinghouse Electric Corp., East Pittsburgh, told the noon luncheon. He used as examples coal, oil, iron and forests, first quoting the opinions as to the limits of U.S. continental resources of these basic commodities, the length of time before they will be exhausted.

Then he went on to prove that the most successful conservation programs were already those which economics dictated. Using coal as an example he declared, "Probably the most outstanding case of conservation is not even known by this name. This is the improvement in the application of coal to produce electric power. In 1921, it took 2.7 lb. of coal to produce a kilowatt-hour of electric power. Due to the combined efforts of electrical manufacturers and electric power companies, it required only 1.3 lb. of coal to produce an average kilowatt-hour last year. This is a 50% reduction in coal requirement. If it had not been made, the power generated last year would have required an additional 137 million tons of coal — or an increase of nearly 25% in our national total.

"When we find it necessary to utilize our lower-grade coal deposits to a greater extent, the vast deposits in the Western states will undoubtedly play a major role. In Montana, Wyoming, Colorado and New Mexico alone, subbituminous coal amounts to about 598 billion tons, while the lignites of Montana and the Dakotas add another 434 billion tons, of which only insignificant amounts are now being mined. What effect the possible shift of coal supplies may have on industrial geography is something only the future can tell, but the prospects certainly seem bright for the West."

Oil supplies probably will run out first, said Fort, then went on to describe possibilities of producing oil from shale and from coal. Here again Western areas contain the supplies of raw material for such process and all will require great quantities of electric power. Lower grades of iron ores are to be found in the West too. As for reforestation, that program is already well under way in the West.

"The most effective efforts toward real conservation will probably always be caused by the laws of supply and demand," he concluded.

Administrative Services

L. W. Brillhart, Chairman
E. J. Wright, Vice-Chairman

WORKSHOPS planned to give the various sections the information they want in view of today's complexities drew good attendance. Changing needs prompted addition of three sections—finance; right-of-way and land; valuation, rates and statistics (formerly part of the accounting section). All had capacity audiences and one held over until Friday to complete its program. Speakers who pulled no punches held attention; brought on lively discussion.

Accounting

J. M. Mayfield, Sponsor
Dexter Stoner, Chairman

"What Information Does Management Need from the Records of Account," theme of the Accounting session, was keynoted by Hugo W. Druehl, manager, Organization Planning and Personnel, Coast Counties G&E. Management, said Druehl, needs *all* the information about its business —past, present and future—it needs it right now and it doesn't want to pay very much for the knowledge. He challenged the accountant not only to study the past in preparing his history of the company, but to remember that "Past is Prologue"; let him remember that management needs *timely* information presented in simple, attractive form. Speed and glamor should be top factors in a company's report program.

He urged the development of analysts who would dress up the accounting information and put it into crisp and simple language. He urged the use of graphs and charts. The accountant should be a salesman and should offer his wares in attractive packages. Even under a strict economy program, this timeliness or vivid presentation should not be sacrificed.

Druehl told of the "Pocket-Book Statistics" which are presented to the management of his company early in the month. This report includes pertinent data, with comparisons for prior periods, reduced by photographic process to a size that can be carried in the pocket for easy reference.

Harold Quinton, executive vice-president, So. Calif. Ed., added that management wants a report that can be read in five or ten minutes, that a paragraph or two pointing out significant facts is worth more to management than long columns of figures. He felt that the analysts should be developed within the accounting organization.

During the forum discussion that followed, the group compiled a list of suggestions which would help to achieve the goal of usefulness, timeliness, and interesting presentation, of reports and at the same time keep costs at the lowest possible level:

1. Train analysts to pick out salient features as reflected over the accounting period and present them in brief and interesting form.

2. Mechanize as much as possible to get information quickly and economically.

3. Inform the requesters of special reports of the cost by placing a footnote on the transmittal letter, "This report required so many hours of preparation."

4. Establish close liaison between accounting department, operating department and management in the designing of reports.

5. Review the present report structure, weeding out those that are no longer used.

6. Present flash statistics to management as soon as available, following with the greater detailed reports later.

Brillhart Wright

Kenyon Backus

Christensen Chavannes

7. Eliminate expensive accuracy checks on informational reports which serve only as guides. This should be approached with caution and with the full knowledge of the recipient.

8. Tie the forecasting program to the report program so that comparisons are easily available.

9. Urge those who request reports to give the reason for the report and explain the intended use in order that the accounting department may make helpful suggestions as to short cuts and completeness. This may sometimes result in finding that the information is already available in a different form and eliminate duplication.

10. Use peg-strip method of filing recurring reports to eliminate duplication of typing and including previously published figures.

11. Round out figures on reports and forecasts where approximation is all that is needed.

12. Schedule reports in order of their importance and timeliness. Do as much work in advance of the final figures as possible. Complete graphs and charts up to the marking for the current period.

A suggested solution to a company's report problems was offered by John A. Higgins and Kenneth A. Wulff of Arthur Andersen and Co. Their graphic presentation of a Functional, or Responsibility, Accounting plan showed how the report pattern followed the organizational lines of a company, producing cost information as they applied to each level.

The advantages of functional accounting, which is tailored to the individual requirements of each company, are: (1) Cost reports are simple, concise and easy to understand. (2) Responsibility for costs is clearly indicated. (3) Budgeting is simplified and budgetary control improved. (4) The accuracy of cost distribution is increased. (5) Its flexibility permits changes to be made easily as new problems arise. (6) The use of the budget as a yardstick makes prior periods' comparative figures unnecessary.

Credit and Collections

Clarence Hughett, Co-sponsor
Cranston Springer, Co-sponsor

Difference between assignments and bankruptcies was described by David S. Davis, Fresno attorney. Davis stated that chapter ten of the Bankruptcy Act involves prompt liquidation of assets "under the hammer," usually on a falling market and resulting in a negligible recovery for creditors. Chapter eleven provides for a plan of reorganization, under which a business may be continued as a going concern and usually results in a greater recovery for creditors, he said.

Assignments are not recommended because attorney's fees and other expenses result only in the liquidation of unsecured creditors, Davis brought out. In his opinion section 64 of the Bankruptcy Act should be amended to include public utilities in the category of quasi-public agencies, whose accounts hold a preferred position.

Checks and negotiable instruments were the subject of William H. Von Elm, assistant manager, Anglo-California Bank, Fresno, in a talk that touched on the subject from the standpoint of both customer and bank. Preparation of check, what to look for in deciding whether or not to accept a check, delayed posting, checks lost in transit, protest, forged endorsements were some of the points covered.

Changes made in the financial responsibility law under the Motor Vehicle Code were explained by F. R. Kendall of the California Motor Vehicles Department.

Finance Group

K. C. Christensen, Co-sponsor
P. C. Hale, Co-sponsor

Steps a corporation must take before shares are issued, transfer of stock and its registration were covered in a talk on functions of the transfer agent and registrar by W. E. Anger, trust officer, American Trust Co., San Francisco. Transfer agents and registrars must first of all satisfy themselves that shares are properly and validly issued, he emphasized.

Pointing out that the work of the stock transfer agent is highly specialized, requiring thorough knowledge of the subject plus experience and judgment, Anger outlined the steps to be taken before a transfer is made and stressed the care the agent must take to insure that every certificate is accounted for. In view of the fact that statutes covering joint tenancies vary in many states, requests that a certificate be issued in two or more names involve difficulties, he emphasized.

The registrar's function, Anger stated, is to control the number of shares outstanding and to prevent an over issue. While appointed by the corporation, the registrar must act independently of it, standing between the corporation and the stock buyer. Many corporations, even though their stock is not listed, avail themselves of the services of a registrar as a measure of protection, he brought out. When an issue of stock is listed on an exchange, a registrar is mandatory.

Financing the huge plant expansion program was discussed by A. L. Chevannes, assistant treasurer, and R. E. Woodbury, assistant general counsel, So. Calif. Ed. The company has made six offerings of securities, aggregating $207,000,000 since the end of the war.

Magnitude of the industry's postwar expansion program was reviewed by Chevannes, who pointed out that, when a large expansion is planned, financial officers of the utilities are faced with the problem of determining how much new money will be required and how it will be raised. Among other things, this planning involves a careful survey of the financial markets and an appraisal of the utility's capital structure and cash position.

In planning a financing program, public utilities pay particular attention to their capital ratios to the end that a balanced capital structure will be maintained, he said. After the method of financing has been determined, the

Tracy Johnson Long Stoner Springer Hughett

legal and financial staffs combine forces to assure compliance with the laws governing issuance of securities.

Discussing considerations leading to the listing of the security on a national securities exchange (requiring registration of the securities under the Securities Exchange Act of 1934), he concluded with a discussion of the desirability of qualifying a utility's bonds as legal investments for savings banks under the banking laws of the several states.

Woodbury's presentation was concerned with legal aspects of the financing program. The principal acts involved in issuance of securities are the Public Utilities Act and the California Corporations Code, the Securities Act of 1933, the Securities Exchange Act of 1934, the Trust Indenture Act of 1939 and, in some instances, the Federal Power Act. Emphasis of Woodbury's talk was on the Securities Act of 1933. Principle of the act, he stated, was full disclosure but, contrary to the belief of many, the Securities and Exchange Commission, which administers the act, in no way passes on the merit of the security registered.

Pointing out that offerings of the securities involve very close timing, Woodbury stated that his company has received fine cooperation from the California PUC, SEC, and staffs.

Personnel

R. G. Kenyon, Co-Sponsor
R. E. Johnson, Co-Sponsor

Wage rate sells the prospective employee; the benefit program keeps him sold—the two aren't interchangeable, Robert D. Gray, director, Industrial Relations Section, CIT, said in introducing his talk. He advised the company not to confuse its benefit plan with other expenses and privileges; to iron out the matter of employee contribution and eligibility. Be sure the employee and his family understand the plan, he advised; otherwise the company won't get its money's worth. Types of plans and numerous benefits were outlined by Gray.

Help, don't short circuit the supervisor, G. N. Hawley, So. Calif. Ed., asked in a forthright talk on what line expects from personnel. Industrial relations departments are the newest acquisition of business and, while they are doing a fine job, adjustments are needed here and there, he said at the outset. Line now identifies the personnel department as a buffer between management and employees and feels deprived of authority; finally adopts the "what the hell" attitude. Any influence that tends to cause the employee to look elsewhere than his own supervisor lowers prestige, whether that influence comes from outside or inside the company, he declared, adding, "there is only one thing to do, the supervisor must be helped to keep his control; a transfer doesn't help."

In the discussion that followed, personnel men agreed in general with Hawley, although it was pointed out that the industrial relations department is an equalizer needed in today's complex operations.

Edison's pictorial techniques for explaining benefit plans concluded the meeting.

Purchasing and Stores

Neill F. Backus, Sponsor

That a great deal of benefit can result from an open and frank discussion between suppliers and customers was demonstrated when some 25 representatives of leading electrical manufacturers and distributors were on the receiving end of pertinent questions by utility purchasing agents and storekeepers.

Necessity for distributors to carry adequate stocks of standard items to meet customer requirements was discussed under the leadership of G. H. Grummett, PG & E. That closer cooperation between manufacturers, suppliers and customers is the way to alleviate many of the present-day shortages of materials, was the consensus. It was brought out that the supplier has a distinct obligation to furnish the customer with advance information of inability to meet delivery promises indicated on the purchase order. It was realized that an effective set up to accomplish this will require considerable thought and planning by the supplier, but it was emphasized that the end results should be well worth the effort.

The second discussion, on failure of the supplier to follow shipping and package marking instructions with consequent difficulty in identifying shipments, was led by S. R. Robinson, San Diego G&E. It was urged that distribution transformers be shipped in open trucks when that method of transportation is used, to facilitate unloading. Care should be exercised by the shipper in selecting reliable methods of transportation to eliminate difficult or unsuccessful settlement of damage claims.

Unnecessary delay and expense of auditing incorrect billings was discussed by D. J. Barker, So. Calif. Ed. It behooves each supplier to be certain that his billings are prepared completely and accurately so that approval and payment may be made in an orderly manner, it was stressed.

Return of empty cable reels was the subject of a special meeting on Friday between utility representatives and cable manufacturers.

Right-of-Way and Land

H. L. Moore, Sponsor

Success of this first meeting as a recognized section of PCEA was attested to by the fact that one or more delegates were in attendance from 18 member companies. Presence of Ray Johnson, vice-president of the Hawaiian Electric Co., demonstrated that right-of-way is a problem in the Islands as well. Qualifications of a good right-of-way man were defined as a blend of three ingredients: engineer, legal training, salesmanship. Subjects treated were: "Appraisal and

Acquisition of Rights-of-Way," under R. W. Long, PG and E; "Some Legal Aspects of Right-of-Way Acquisition," led by J. K. Horton, Coast Counties G&E; "Distribution Rights-of-Way," introduced by Francis J. Van Lohn, So. Calif. Ed. R. S. Ruffin, San Diego G&E, opened the Friday session by discussing "Right-of-Way Work as an Asset to Public Relations." Appraisals of right-of-way and real property were presented by Joseph Gallagher, president of the American Right-of-Way and Appraisal Contractors.

Valuation, Rates and Statistics

J. F. Brennan, Co-sponsor
Charles Grunsky, Co-sponsor

"Is Valuation What You Think It Is?" opened the program for this new section. A. A. Mott, director, Valuation Division, California State Board of Equalization, the first speaker, defined valuation as a strange mixture—"part engineering, part economics, part legal and usually sprinkled with a little accounting to add spice." Since past and present construction costs usually are a part of any valuation, this field has come to be dominated by engineers, he said.

Engineers, he said, should realize the full meaning of the word "value," which means many different things to different people. Valuations are usually made for one or more of the following reasons: (1) voluntary sale, (2) eminent domain, (3) financing, (4) insurance and damages, (5) rate fixing, (6) taxation. Mott gave the benefit of his careful analysis of the term value as it applies to each of these, giving particular emphasis to the sections on rate fixing and taxation.

George Kinsman, director, Fuel, Power & Water Department, California Manufacturers Assn., presented the case of "The Customer and the Rate Maze." This serious illustrated discussion of an imaginary customer's problems with the multiplicity of available tariff schedules was highlighted by adroit use of humorous situations and comparisons. Kinsman proposed the simplification of existing schedule forms and elimination of many of the optional schedules as a means of improving customer relations and, at the same time, simplifying the work of the billing departments and customer contact employees.

J. F. Brennan, PG and E, in a talk on the application of the techniques of statistical mathematics to public utility problems, made a good case for the more extended use of such techniques in public utility fields. His thorough knowledge of the subject, combined with his able presentation

Gallagher Moore

Anger Woodbury

of various applications of statistical methods to problems in utility work, made this very technical discussion interesting to everyone attending the section meeting.

Business Development

G. N. Hawley, Chairman
R. I. Mendes, Vice-chairman

INTO the "Buyer's Market" stepped a series of customers, contractors, dealers, farmers, etc., in most cases intent on buying something non-electric. It was then that the salesmen of the industry went to work to sell them what services the committees of the Business Development Section are preparing to meet each need. Thus in one skit Friday morning, the five committees of the section made their reports on what they had discussed and decided upon as a program during the Thursday afternoon parallel sessions.

Chairman George N. Hawley, So. Calif. Ed., called upon Advertising Committee chairman, F. M. Raymond, San Diego G&E, for an idea on how to present to the entire section the work of each committee. Raymond said that his committee, in its discussion of advertising media, special edition and program advertising, and other difficulties of the advertising department, had all agreed that "advertising comes before sales." Hence he called upon the committee vice-chairman, W. A. Cyr, ELECTRICAL WEST, to become a series of customers in the Buyers Market (a stage set on the platform behind them) and to find out what kind of salesmen the committee chairmen were. With the aid of a variety of hats, coats and vests, Cyr obliged and stooged.

Before each chairman's "pitch," Raymond insisted that advertising came before sales and H. E. Silvernail, Graybar Electric, as a sandwich man, appeared and marched up and down the aisle, ringing a bell, blowing a horn, making noise, calling sales slogans. On front and back he bore signs with slick slogans; on his head a hat bearing more signs. Thus the Business Development meeting was turned into a show and the work or program of each committee described *to* the "customer" but *at* the audience.

Agricultural Load Building Group

J. A. Corlett, Chairman

To Joe, the farmer, Jack, the salesman, explained the fuss made over him was because of the importance of the farm business to the electrical industry, a business that has increased 40% in customers, 143% in kwh. sales, 100% in electric revenue since 1940, but, since farm income has increased 223%, certainly much more could be sold to the farm market.

To do this Corlett said the group has asked the directors to set up a full-fledged agricultural power committee. It will initiate an area-wide 4-H cooperation program. It will make studies of the potential electrical uses for the small farms to which so many people are migrating. It will study and prepare helpful data on vertical diversification — that is, more processing of farm products right on the farm. Likewise it will study horizontal approach to the farm market, such as industrial crops. Also it will find out and publicise the availability of farm electrical equipment through farm magazines and papers. Up-to-date figures on crop costs will be accumulated to aid in determining the economies possible with electrical equipment.

Commercial, Industrial Lighting

John S. Walsh, Chairman

Two topics, school lighting and fluorescent maintenance, said John Walsh, PG and E, had been selected from all the rest for the year's work of this committee. So the trustee of a school district met the salesman who called attention to the archaic lighting in most schools and told how the entire environment could be changed with new, light-toned decoration and chalk boards, sanded desks and floors and replacement of the "balls of fire" with nine 500-watt silver bowl lamps in properly shielded fixtures at about $20 per student. The experimental classrooms modernized at a number of schools in California were cited as

Rice Hampton Harper Chamberlain Jones Adams Hawley

proof of what could be done. Such modernization would represent a market of $25,000,000 for the electrical industry.

For the recently voted new school program Walsh recognized the fad among some "modernists" in architecture to provide daylighting only, from several sides, but he demonstrated how many dark days there were, even in sunny California. The committee, he said, intends to work on these "buildings without light."

As a store owner as well as school trustee, the customer complained about the blinking and other troubles with the expensive fluorescent he had put in the year before. He was shown by Walsh that a high-class lighting installation, like a high-grade car, needs expert upkeep and signed him up with a maintenance contract. The proper maintenance of fluorescent lighting could mean a $48,000,000 business to the industry each year, Walsh said.

A subcommittee to study it and bring forth recommendations for its solution, headed by Walter Carlson, General Electric lamp department, Oakland, is part of this committee's program. (At the committee session Thursday, Doyt Earley, architect for California Schoolhouse Planning Division, Sacramento, spoke on the building program for schools. Tom Esling, So. Calif. Ed., gave suggested solutions. Sam Hazelton, G-E lamp division, related the fluorescent maintenance situation, and Bert Osterman, of T. L. Rosenberg Co., Oakland, which operates a successful fluorescent lighting maintenance service, spoke on the operation of such a department.)

Industrial Power, Heating and Welding Group

C. D. Smith, Sponsor

To John Q. Public's protests that more industrial growth will mean more smog, dirt and noise, C. D. Smith, Westinghouse Electric Corp., group sponsor, answered that with the attractions of the West bringing more and more people, means must be developed to employ them so that they can eat. It is better to provide industries that open work opportunities than to support them by taxes. The farms, stores, gas stations, etc., will not begin to support all the public. But with a population increase of 45% since 1940, there has been an increase of industrial employment of 85%. Such employment at good wages makes a rich market for electrical living, for electric energy, for industrial equipment. A third of all electric energy generated is used in industry. In plant increases, which means business for supplier and contractor, industry has grown by some $69 billion, of which $300 million went into electrical equipment, wiring and installation.

He forecast another 35% population increase by 1960, which would require a 50% increase in industrial plants. He mentioned that a major community can be industrially successful if it has only one basic industry, but the West has a multitude of them, each of appreciable size.

He gave no indication, however, as to what the group was proposing to do except to contribute its support and best thinking to this industrial growth so that the electrical industry may enjoy its proper share of the prosperity of the period ahead.

Electrical Living Committee

H. C. Rice, Chairman

That "Electrical Living" means "raising home living standards electrically" was explained by H. C. Rice, So. Calif. Ed., to the "customer" who asked about it. To a second question, "What does electrical living mean to me as a customer?" Rice presented the chairmen of each of the six committees under the electrical living committee to answer for his or her particular activity.

Kitchen and Laundry Committee

K. L. Hampton, Chairman

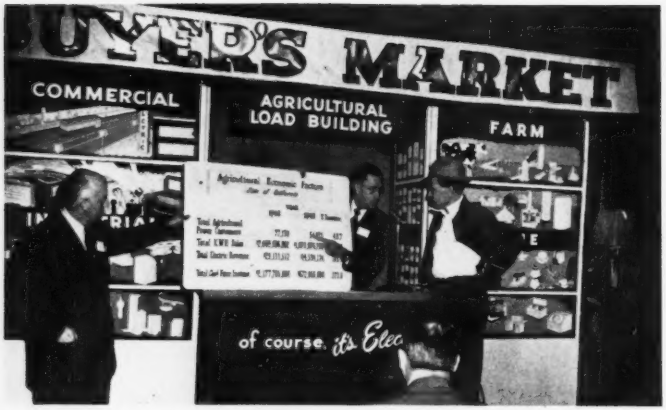
It was an employee of one of the companies in the industry who did not think he could afford the electric kitchen and laundry for his own home whom Ken Hampton, Valley Electrical Supply Co., Fresno, met and convinced otherwise. For he felt the first job that his committee should undertake would be to develop plans by which employees of electric manufacturers, distributors, dealers, contractors and utilities may buy and use and brag about electric kitchens and laundries of their own. Particularly the new employees in the industry should be using these electrical servants.

The program is to develop separate plans for manufacturers' employees, even factory workers; dealers and contractors through their distributors; utility personnel in coordination with manufacturers. Finance plans would be developed to assist in the purchase. A direct-mail campaign would be directed to all employees on a regular schedule each month of the year.

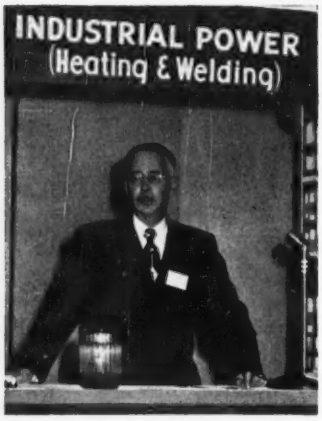
Home Economics Committee

Marjorie Harper, Chairman

A skeptical dealer was the customer Mrs. Harper had to sell the value of the work the home economics committee is doing and has done so far. First she convinced him that demonstrating is a better way of selling than mere sales talk. Then she told how the Electrical Living Institutes, conducted last year in San Francisco by Marguerite Fenner of PG and E and which Mrs. Harper, G-E home economist, is herself conducting for the PCEA in Los Angeles and San Diego, were equipping teachers of home making classes to teach electric appliance values and uses. These 100 or more teachers in the San Francisco area and 250 in southern California will conduct an average of five classes a day,



Buyer's Market, at which Adman F. M. Raymond, left, helps Jack Corlett sell farm customer Cyr. Set was made by Dave Evans, Roger Arnold and Andy Lucas



Smith

Silvernail the Adman

Customer and Walsh

each with about 25 students, all of whom will become homemakers and the customers of the future. In three years this means some 30,000 students. Thus her committee is preconditioning the customers of the dealer so that he will be able to sell them easily in the near future.

Television Committee

J. Clark Chamberlain, Chairman

It was a confused prospect for a television set who put the questions to Lowell Garrison, G-E Supply Corp., San Francisco, vice-chairman of the committee. And he was able to answer them intelligently and satisfactorily because the work of this committee is concentrated at present on issuing a bulletin which is sent to dealers throughout the area. Its purpose is to give them a uniform answer for the public to the questions which the press reports arouse and which confuse them and make them hesitant to buy television. Such questions as whether to wait for color television, whether television is hard on the eyes, what size tube set to buy and what difference there is if the tube size is expressed in square inches instead of diameter, ultra high frequency vs. very high frequency and obsolescence of sets, and whether prices are coming down, are answered in this bulletin.

Home Lighting Committee

J. W. Howard, Chairman

In the process of building a home and given a $25 fixture allowance the next customer approaches J. W. Howard, G-E lamp department, Los Angeles. Howard shows the sad plight of home lighting and what it is costing the industry—utilities missing 175% increase in load, lamp bulb makers 125% in renewals, wholesalers 173% in equipment sales and customers in decent seeing conditions. He showed that before the war the customer could get lighting information from many sources and that there is much material available now if it will be used. He explained the CLM lamp and what it represents.

The home lighting committee, said its chairman, suggests to PCEA that several permanent lighting displays be established for customers to see and try lighting equipment. Also that utilities reestablish home lighting advisors or train its adequate wiring crews to be able to advise the consumer. The committee advocates advertising in all media. Examples of active lighting programs by utilities were mentioned, particularly that of Central Arizona Light & Power Co. Howard demonstrated the skimpy fixtures that the average new house receives now and ended by declaring that the home lighting market is one that can never reach saturation.

Adequate Wiring Committee

J. H. Adams, Chairman

To an electrical contractor John Adams, So. Calif. Ed., explained what the term, Adequate Wiring, meant and reviewed the way the home has added appliances since 1910 when a drop cord per room was considered adequate. Each decade had seen the introduction of a number of new appliances. To the contractor's contention that competition caused him to cut outlets to keep his price down, Adams answered that there are not enough contractors in business to fill the need for wiring that exists today, if all will sell it.

The committee plans, said Adams, educational meetings to reach contractors, architectural classes, builders, architects, electricians, distributors and dealers, women's clubs and luncheon clubs. It asks that much of the industry's advertising be devoted

to wiring. Posters for trucks are being prepared, cards for the job site. And the committee will issue a bulletin, edited by C. V. Soper, to be sent to all contractors, dealers, inspectors, plumbers, architects and building contractors.

L. P. Gas Committee

Lyle B. Jones, Chairman

Pasquale was going to buy his old woman a new bottled gas range but persuasive Howard Oliphant, G-E, on behalf of Lyle Jones, San Diego G&E, chairman, soon sold him on electric cooking. He had all the right information to meet the competitive situation, such as the comparative cost of ranges, of installation, of tank investment, of operating cost, speed of cooking and safety. Besides he knew the superiorities of electric cooking to sell Pasquale, the farmer.

It is thus that the LP gas committee recommends that this competition be met, by outselling it. The committee is determining if the power situation is now such that a united effort to tell the electric cooking story to rural areas is propitious. It proposes that cooking schools be used as a medium to bring country customers to meetings where the idea can be demonstrated and sold. Such an activity would tie in the combined efforts of utility, dealer distributor and manufacturer.

With this skit the presentation was brought to an "explosive" finish.

Chairman Hawley concluded by an able summary and ended by reminding all that the world is in a cold war of ideologies for the capture of the psychology of the people. In this war the sales people are the front line for the business way of life, the enterprise system, capitalism and the American way of life, which is becoming the electrical way of life.

Bert Osterman of T. L. Rosenberg Co. explains what a fluorescent maintenance service requires in organization, methods and equipment at light meet

Operating Economics

F. D. Beardsley, Chairman

EXCELLENT papers and discussions and large attendance again marked meetings of the Operating Economics Section. Each year's meetings of this section seem to have become bigger and better. This year topped all others for attendance, quality of programs and enthusiasm. A resume of each group's meetings:

Communications Committee

P. H. Adams, Chairman

The communications group entered into a detailed discussion of the serious implications of the proposed FCC regulations and assignment of frequencies for carrier current. This plan would impose governmental regulation to carriers in a manner similar to that in effect for the radio spectrum. The attitude of utilities toward, and the complications involved in permitting non-company carriers on utility power lines was surveyed. It was brought out that the vast increase in electronic equipment is developing a growing demand by outsiders for permission to apply special purpose carriers to lines.

Analysis of the protection problems met in the joint construction of power and communications circuits on the same pole lines stressed the need for mutual cooperation between power utilities and communication utilities. Follow-up reports were heard as to the performance record of microwave channels which had been described at the Coronado meeting last summer. Problems connected with power line interference to television were discussed at length. It was obvious that this may well become an important and expensive consideration with the rapid growth of the television industry. It was hoped that the utilities might cooperate in the establishment of an industrywide standard procedure for the investigation and correction of television interference.

Increasing traffic on mobile radio systems made most opportune a discussion of methods for reducing the time required to transmit each message. This problem made very clear the need for planned training of radio operating personnel, and the merits of establishing a streamlined operating procedure.

Hydro Group

G. C. Crawford, Sponsor

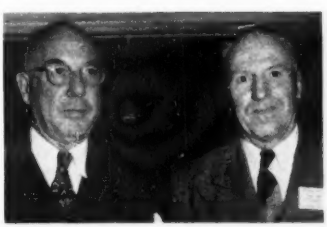
Stress, strain and vibration measurements of water wheel buckets were presented in papers by I. M. White, Pelton Water Wheel Co., A. C. Werden,

Beardsley Straub

Blecksmith Fredrickson

Bowen Christensen

Templin Tubbs



Cowles Schomberg

So. Calif. Ed., and E. A. Crellin, PG and E. White said measurements on buckets in service are most important. Obtaining the best possible bucket resolves itself into two major operations, i. e., design and manufacture. Design practice has been confirmed by the measurement work which has been done. Manufacturing methods must be maintained under rigid control, he said, to obtain the results of good design. The new strain gage tests on buckets as recently applied to certain hydro units were presented with slides to illustrate results.

Results of Edison tests and frequency measurements of bucket natural periods were described by Werden. Performance of buckets in terms of power output, service hours, loading and stress reversal were presented to confirm the theory that each bucket installation is an individual problem in design and manufacture.

The whole discussion brought out the following important points: (1) Design practice has been confirmed by measurements. These measurements must be continued to obtain the best results in design. (2) Rigid control of the manufacturing procedure must be established and maintained. (3) Adequate testing must be applied in every way possible to guarantee the manufacturing procedure and finished product. (4) Testing procedures recognized as essential were: making a pilot bucket and testing this in a completed unit; establishing a manufacturing procedure based upon the pilot bucket test results; making all possible tests of the finished product. Essential tests recognized include microanalysis of the material structure, magnaflux tests, supersonic tests, X-ray tests, and others for flaws in the material.

Meter Group

C. C. Blacksmith, Sponsor

Both sessions of the meter group were well attended and considerable discussion took place on the variety of subjects presented. Highlight of the Thursday afternoon session was the discussion lead by M. A. Fredrickson, So. Calif. Ed., on meter obsolescence. The methods generally followed in meter retirement programs and the factors affecting meter obsolescence were discussed with the general conclusion that developments in meter manufacturing and the art of metering are the strongest forces influencing retirement policies. Other presentations were reports by representatives of local coordinating committees and the EEI.

On Friday morning demand metering of domestic and short duration loads was a principal topic of discussion. E. W. Trenkle, Central Arizona Light & Power Co., concluded that, on the basis of air conditioning loads peculiar to his system, the demand metering provided the only basis for equitable billing both for the customer and the serving agency. In addition to presentation of new developments by manufacturers, the group entered into discussions on service entrance cable, totalizing metering and the testing of standards.

Safety Group

E. C. Hunt, Sponsor

The safety group held an all-day meeting prior to the opening of the Fresno conclave, which was well represented by the various companies in the PCEA. Since the last meeting, individual members had been assigned the task of preparing certain sections of a new proposed Rule Book to be presented to the group for discussion. Previous discussion on this subject had brought about recommendations that the Rule Book should be of a loose-leaf type in order that it might be kept up to date and that certain sections of rules and regulations could be supplied to the employees on the subject material relative to the operations of their department. It was possible at this meeting to start with the introduction and basic rules section, completing two-thirds of the units which were discussed and agreed upon. Uniformity of rules being paramount, considerable discussion was had before deciding on the correct wording of proposed safety rules. It was felt that this meeting was very successful as the introduction and the major portion of the basic rules were revised and agreed upon.

Because of the diversified activities of the various companies represented, unification of the Rule Book is a greater task than most of the members realized. In order to speed up and facilitate this Rule Book, the group were unanimously in favor of calling a future meeting in the middle of February 1950 in order to complete the basic rules section and possibly the automotive section and start on the overhead and underground section. It was felt that by devoting the entire time to unification of a Rule Book they could accomplish considerably more than by tying it in with a convention.

Steam Generation Group

Alf Hansen, Sponsor

The subject of soot and slag removal was ably presented by three speakers, J. J. McDade, So. Calif. Ed., K. Campbell, San Diego G&E, and C. W. Shepard, L.A. Dept. of Water & Power. The speakers reached common ground in stating that slag troubles were most serious in the superheater and air preheater sections. In general, soot blowers were effective in the steaming sections of the boiler. Interesting was the fact that practically full load was possible even with up to 70% closure of the passages without loss of efficiency.

Fuel oil burning problems from the standpoint of burner selection, combustion control, and heating surface fouling were discussed by E. G. Gothberg, PG and E. Steam atomizing burners are successful at PG and E refinery plants, while in other stations the trend is toward high-pressure return mechanical atomizing types capable of automatic handling of wide operating range variations. Centralized control requires burners which respond quickly to load fluctuations. Factors contributing to such requirements are automatic burner retracting mechanisms, automatic adjustments to oil pressure ratios and flow control valves. Southern California Edison approaches the problem from the standpoint of oil handling and burner tip maintenance, according to H. C. Bennett of that company. Constant readiness of fuel oil systems is effected by maintaining fuel above 90° F. via intermittent circulation to heaters and burner headers.

In a panel discussion on programs for annual maintenance of steam generation equipment, C. Gothberg, PG and E, presented a comprehensive study of the relation between machine and outage time and job cost for various work-week schedules. This makes possible estimating the cost of replacement power versus the extra cost of multishift or extended work-day schedules. Scott Jensen, So. Calif. Ed., discussed attempts to eliminate minor overhauls to boiler and turbine to reduce shutdown time. He suggested this be done by routine tests and studies to correct such things as corrosive action of feedwater to boiler, breakdowns of turbine lubricating oil, and silica deposits on turbine blades. A planned preventive maintenance schedule and the need for an especially trained group to reduce expense and time and to improve quality of maintenance work was advocated by F. G. Philo, So. Calif. Ed.

Importance of checking all pieces of equipment periodically for vibration and not just the large pieces of equipment was pointed out by R. B. Barton, G-E. Quite costly repair bills can result from ignoring vibration in even small pumps and panelboards. A certain amount of experience is needed

to evaluate cases of vibration and to determine what can be considered as non-deterimental in various pieces of equipment. John Hardway, San Diego G&E, described a serious vibration problem in the main steam line to one of the Silver Gate units. The condition was caused by two 10-in. steam lines which entered a horizontal header at an angle of 90°. It was a very high-frequency vibration. It was decided to bring the two lines together by means of long radius bends into a horizontal "Y", thus smoothing out the flow of steam. W. H. Chown, L. A. Dept. of Water & Power, described a resonance condition which occurred in a 14-in. main steam line. This was caused by a cross with two blind nipples projecting horizontally. This cross was the one fixed point in the steam line, being anchored to the building steel. A resonant condition set up by the steam flow past these two blind nipples was cured by plugging one of the nipples off at the "T", which destroyed the resonant condition.

Methods of supplying station auxiliary power with particular reference to the use of house generator sets, were discussed by V. F. Estcourt, PG and E, and W. Halpenny, So. Calif. Ed. Estcourt analyzed the whole problem and described recent plants on his system where house turbines of the condensing automatic extraction type have been used. They fit into plants with 5 psi. deaerators with very little steam going into the condenser. System disturbance separates an auxiliary bus and leaves auxiliaries on house units. Less than 100% reserve for auxiliaries can be obtained cheaper with smaller less expensive non-condensing units for those willing to take the extra risk, said Estcourt.

At the Redondo steam station of the Edison company two normal and two emergency sources of auxiliary power were provided, reported W. Halpenny of that company. Normal sources are two 66/2.4-kv. transformers feeding two separate buses. One quick-start house unit is connected to each bus. These are started by low-frequency or low-voltage conditions.

Substation Group

H. N. Skow, Sponsor

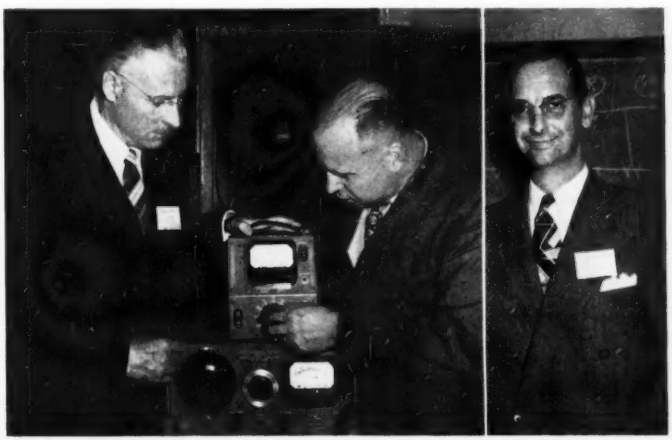
Portable substations were topic of discussion in the first group session. J. C. Coulter, PG and E, described uses made of these portable subs on his system. Prior to 1938, many PG and E stations were built around single-phase transformer banks with spare units to permit maintenance work or emergency operation. With the acceptance of 3-phase units however, stand-by equipment became increasingly useful. A 2,500-kva., 22/12/4-kv. portable with links to permit delta-delta, delta-star and delta-zig zag connections was obtained to fulfill that need. The portable is forced oil, forced air cooled, has high-voltage fuses and a low-voltage OCB. It also has high-voltage taps and a low-voltage tap changer. The unit is trailer mounted. From November to February it provides for any emergencies in the Bay area, while during the remainder of the year it is used for maintenance work.

C. Mack, San Diego G&E, described operating experience with a portable sub used on his system. The unit is also forced-oil air-blast suitable for delta-delta or delta-wye connection. In two years use the unit has been called upon 45 times. Four of these were emergency troubles while the remainder were for maintenance purposes.

J. C. Meier, W. N. Matthews Corp., St. Louis, discussed the engineering and economics of reducing outage on rural lines. He said indications are that the greatest economic and operating advance in rural line operation will result from studying effectiveness of 2-, 3- and 4-shot reclosure devices and putting results to best use. The 4-shot pole-top reclosure attains 5% more successful reclosures than a 3-shot fuse device, but the cost exceeds $110 for each outage elimination. This figure will either have to be reduced or apparatus developed to extend the range of the recloser. Meier stated that lightning caused 43.5% of rural outages, tree trouble 18.8%, lightning arrester failure 6.6%, public accidents, 4.8%, defective insulators, 2.5%, and wind burndown, slack span, broken pole, and defective equipment caused the rest. In comparing the economics of the different types of reclosing devices, he stated, "a 3-shot fuse recloser will render better than 90% of the effectiveness of a pole-top oil circuit recloser and a 50% of the cost; a 2-shot will give 65% of the effectiveness at 40% of the cost."

The Friday morning session opened with a description by J. L. Buckley, PG and E, of Fulton substation — a completely automatic 45,000-kva. sub-

Crawford Werden Hansen Gothberg



Adams Lake Skow

station. All automatic operations, breaker operations and fault alarms are transmitted to the Santa Rosa station by means of carrier. To date, this automatic station has had twelve automatic operations under fault conditions and in each case these operations have been correct and desirable, it was reported.

A. J. Swank, PG and E, and E. B. Rynn, So. Calif. Ed., discussed substation assembly and construction procedure. Both emphasized the importance of planned construction, making maximum use of men and shop construction and mobile equipment for field construction. In the erection of bus structures, as well as the installation of electrical equipment on such structures, mobile cranes have proven themselves very useful.

G. H. Chesson, So. Calif. Ed., started a discussion on substation design for congested and restricted areas. A specific example of substation design in a restricted area was given. The unique feature of this substation was that it was largely underground and was extremely compact.

Transmission and Distribution
Underground Section

H. S. Christensen, Sponsor

A paper by F. S. Benson, PG and E. on application and termination of underground cables brought out the many features of paper and lead cable. Various types of cables and their particular uses, sheath corrosion, causes of cable failures, terminal and manhole and duct design, were discussed. Slides were used to show practices in the use of paper and lead cables. Practices of San Diego G&E in the use of rubber-like insulated cables was discussed by J. B. Bowen. He related several operating experiences in the use of shielded and unshielded 5-kv. cables.

A round-table discussion on oil fuse cutouts for subtransmission voltages was led by George R. Smith, Los Angeles Department of Water & Power. It was emphasized that present oil fuse subway cutouts are limited in voltage ratings and in interrupting duties. The group agreed that there is an ever increasing need for 11-kv. to 16-kv. subway cutouts.

C. N. Parker, Calif. Elec. Power, presented data showing the variations in the design of vault and manhole castings as used by various utilities. An open discussion stressed the need for standardization of the present numerous designs. It was the recommendation of the section that a committee be formed to study the present designs and to make recommendations for the standardization of vault and manhole openings.

George S. Brand, PG and E, discussed electrolysis problems in San Francisco caused by recent changes in the municipal railway. He expressed a need for more study of electrolysis problems and closer cooperation between mutually interested utilities.

Economics of various plans for serving residential subdivisions with underground systems was discussed by R. C. Blankenburg, So. Calif. Ed. It was pointed out that underground engineers should do more research and develop a completely new underground system for lightly loaded areas. The result of an open discussion of the subject indicated an ever increasing need for lower cost underground for residential areas.

Overhead Section

H. J. Schomberg, Sponsor

Progress reports on the topic of aerial patrol of transmission lines were made by G. A. Peers, PG and E, and C. W. Sanders, So. Calif. Ed. They indicated the advantages of helicopter vs. fixed wing planes for such activities. Their experience indicated that the hourly cost of patrol was greater with the use of helicopters, but that helicopters were more advantageous to the extent of requiring less space for take-off and landing. Peers stated that snow surveys had been made by means of aerial observation. R. R. Cowles, PG and E, outlined the development and extent of the distribution systems of various voltages for his company, and indicated that the trend is definitely toward higher voltage. He pointed out that studies made by his company indicated that the nominal 12-kv. system was the most economical.

T. A. Bettersworth, PG and E, as leader of the round-table discussion, presented the economic factors to be considered in the selection of bare conductors for overhead distribution lines. He pointed out that the selection of the type of conductors would be contingent upon whether they were to be utilized in light or heavy loading areas and that comparative studies indicated that the cost of structures decreased with increase in ultimate strength of conductor employed.

N. K. Yarnell was round-table discussion leader on the topic of distribution transformer operating practices. He presented a paper on the banking of transformers, wherein he pointed out the advantages to be obtained by such application.

E. C. Hunt, safety engineer, PG and E, led the discussion on the topic of standardization of mechanical hardware and electrical connectors for hot-line tool application. It developed that the thing desired by all concerned was the reduction to a minimum of all the hot-line tool fittings and a reduction in the number of the sizes of nuts utilized on split-bolt connectors when used for hot-line work.

Transportation Group

W. H. Brown, Sponsor
M. D. Tubbs, Chairman

Using a series of slides, E. W. Templin, Los Angeles Department of Water & Power, showed pictures of labor-saving devices such as combination hole digger, pole puller and pole setting units and payout and takeup wire trucks and trailers. He stated that despite the relative high cost of this equipment a significant saving is realized on the over-all cost of the job through reducing man-hours of labor and line outage time.

C. E. Ellis, So. Calif. Ed., spoke on the economies effected by use of modern shop tools, testing devices, wheel aligners and balancers, radiator flushing machines, cleaning equipment and surface grinders. His company trains men in the use of these special tools thereby decreasing the out-of-service time of equipment sent in for overhaul, and also doing a better job by elimination of guesswork and man-hours of manual labor.

In his discussion of winch drive controls, C. R. Stanley, PG and E, told of developing a combination vacuum electric control for winches which it was hoped would eliminate the hazard of loads being dropped. It was also brought out that by using a locking dog on the present winch, much of this hazard could be overcome. A free spool winch is necessary. This prevents development of power application in both forward and reverse operation which in itself would be a positive safety factor. He also stated that reporting defective or worn parts immediately, thereby causing their replacement, would prevent many accidents. Controls should be simple and easy to operate.

R. M. Middleton, San Diego G&E, in discussing out-of-door storage of vehicles, told of the savings effected by housing vehicles properly. Some of the additional costs incurred by outside storage are: weather proofing of ignition systems, anti-freeze solutions, engine heaters, rusting, frequent washing, painting, and time of crews lost due to failure of engines to start in the morning. Housing costs will be a subject for future meetings.

Grayson Frey

Stromme Rickey

Allen Bettannier

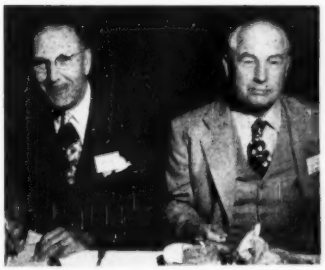
Rates, Engineering, Economics Discussed by CMUA

A well rounded out program of papers dealing with social, economic and operating problems of municipal utilities was presented before the annual meeting of the California Municipal Utilities Assn. held at Santa Cruz, Calif., Nov. 16-18. The conference was officially opened by a word of welcome by Mayor Sam Clark McKeely.

Handling traffic problems during utility construction was the subject of an excellent paper by George C. Sopp, Los Angeles Department of Water & Power. The traffic problem in Los Angeles has increased tremendously over the years and traffic regulations are very important in maintaining good public relations. He stated that a special committee on Surface Traffic Interference had been established and members of that committee included the telephone companies, gas companies, auto clubs, general contractors and the local police department.

"Where Do We Go From Here" was the subject of an address by David E. Faville, dean, Graduate School of Business, Stanford. He said that over a long period of years productivity per man-hour has been increasing through technological improvements and better operating methods. However, the process is a relatively slow one and has improved only approximately 8% in the last ten years. He also said that the fundamental economic undercurrent in the United States is inflationary, not just this year, this decade, nor this last 50 years. A large democracy always finds it easier to spend than to impose taxes.

Clayton M. Allen, engineer in charge of General Plant Division, Los Angeles Department of Water & Power, discussed "Automotive Driver Testing and Education." He said the combined department fleet consisting of both water and power systems was entered in the sixth annual fleet safety contest started on July 1, 1949 by the greater Los Angeles Chapter of the National Safety Council, and advanced its standing from second place in July and



Baxter McCambridge

August with accident frequency rates of 3.39 and 3.37, respectively, to first place for the month of September with a rate of 3.08. He believes, through driver testing, coupled with education in fundamentals and laws of motion they would be able to accomplish their objective in lowering automotive accidents to a minimum. Their testing program covers many phases pertaining to steadiness, distance judgment, sight vision, hearing, night vision, glare resistance, visual and color confusion. They have adopted fundamental tables in reaction time and stopping distances. Results of their program have been gratifying.

"Rate Trends of Private Utilities in California" was discussed by Harold P. Huls, commissioner, California Public Utilities Commission. If the utility business is so conducted as to meet successfully the full cost of operations, the trend of rates on the utility's price for its product cannot long lag behind the trend of its costs, he said. The commission recently has granted general rate increases for only two electric utilities and now has pending an application for such increase by a third. These are the first general increases in California electric tariffs which have been authorized since the inflationary period following World War I. This would indicate a desire and an endeavor by the private electric utilities to meet current economic conditions without increasing their charge to customers. Water rates have been increased by a number of the utilities under their jurisdiction in the past few years.

Edward Hyatt, state engineer, Division of Water Resources, Department of Public Works, discussed "Current Status of California Water Development." He said that 100 years of California history provide this firm lesson for the future: Continued growth and prosperity of our state can only be possible with concurrent development of our water resources. California's past record of achievement in the field of water development is outstanding. The California Water Plan will meet the needs for the immediate future. However, as the future unfolds and conditions change, planning should and must continue.

The American Public Power Assn. has a membership of over 600 municipal and publicly owned electric utilities and that membership is increasing, said Samuel B. Morris, president of the APPA. He said he does not favor government control of small projects over the country, but the size and magnitude of other projects makes governmental control almost necessary.

J. Hunter Clark, industrial engineer, Oakland, gave an excellent paper on the subject "More Light and Less Heat —An Answer to Labor Relations Problems." He said that in most cases their experience has shown that differences between management and labor are purely a problem in human relations and that he saw no need of such things as strikes and other methods used to solve these problems.

Other papers on various subjects rounded out the three-day meeting.

Officers elected for the ensuing year were J. H. McCambridge, Burbank, president; Cliff Plummer, Modesto, vice-president; F. V. Frey, Pasadena, secretary; Fabien Miller, Palo Alto, treasurer. Long Beach will be host to the 1950 meeting of the association.

Jewell

Scott Dillin Rice Wheelock Jewell

Watch Those Extras, NAED is Told

PRACTICAL problems in electrical supplies distribution received the attention of more than 200 members and guests of the Pacific Zone, National Association of Electrical Distributors, at its Annual Fall Convention in Coronado, Calif., Oct. 17, 18 and 19. Concentrating on the newly developed "panel discussion" type of meetings, the group gave its attention to "The Control of Extra Services," "Making the Small Parts Business Profitable," "Bringing Salesmen's Expense Items Into Line," and "Helping Dealers and Contractors Develop Better Salesmen." Major talks by three guests and a panel discussion by electric utility representatives rounded out the program. To handle a heavier schedule, NAED increased to three the number of general sessions.

Following words of greeting from San Diego's Mayor Harley Knox, the assembly heard an inspiring talk on "Practical Ideas for Use in Employee Relations" by Theodore Karl, human relations counsel. Employers, while they are in business primarily to make money, should remember that money is made only through the bringing of benefits to others. It is sound business to emphasize to employees and to customers what you can do that will make money for them. Employee relations can be improved, said Karl, by developing the right technique of evaluating their accomplishments and thereafter regularly pointing out to the employee his value and importance in the company's job of bringing benefits to others.

In the first of the three panel discussions, wholesalers took a close look at the variety of extra services they are called upon to perform for their customers and prospects. "Many of these services create an expense that is not justified by the business developed" was part of the question which the group tried to answer by telling what they were doing to control such expenses. E. C. Phillips, San Diego, was the discussion leader. His approach was to the odd stocks that wholesalers accumulate in taking back or canceling orders as a favor to contractor customers. He asked consideration of the need for minimum order requirements, for a review of standard packages. The shortage of adequate and up-to-date catalog sheets and product literature presents a problem costing wholesalers money. Standardization of the handling of defective merchandise would reduce extra costs. Extra office expense of handling cash discounts of varying amounts was another subject Phillips presented.

Second discussion reviewed how the small parts business can be handled by the electrical distributor so that the costs can be reduced sufficiently to make the business profitable. H. E. Farris, Stubbs Electric, Portland, described how a large drug company handles the 40,000 items in its stock. Most important angle was the use of the salesman's record sheet, its carbons serving as a record of the complete transaction. M. E. Robertson told the group what the auto parts industry did to handle its large quantity of small parts profitably, emphasizing that a standard industry parts catalog

Pyle Farris Phillips Redmond

was very helpful. Bert Wiegenstein reviewed the handling of small parts by other similar industries.

Decrying the general breakdown in moral values which is reflected in business in frequent violation of basic ethical principles, George C. Tenney, editor and publisher, ELECTRICAL WEST, urged that salesmanship be substituted for price-cutting. One of the great weaknesses in the business structure is the tendency to sell at figures which will not return a legitimate profit. To do so, he insisted, is an admission that either the goods or services offered are not worth the price asked or that salesmanship is inferior to that of competition. The first move for price concessions usually originates in the prospect's mind, and is simply a test of salesmanship. Salesmen themselves usually do their best selling jobs on *sales managers* in order to secure a price advantage which they think is necessary to cover up a poor initial selling job.

Reviewing what is being done "to bring salesmen's expense accounts into line," wholesalers and their guests, under E. P. Seigert of Central Electric Co., looked to the application of economy in their own houses. Showing that salesmen's allowances for travel and entertainment varied widely throughout the industry, Seigert said the reason salesmen's accounts must be cut comes as a hangover from war years. Management, beset by many other problems, paid little attention to rising salesmen's costs when war orders took the bulk of the business. And in many other cases, salesmen's expenses were allowed to go very high as a means of giving the salesmen extra compensation at a time when the law held their salaries at a low level. Habits formed by salesmen during such practices cannot be continued in the postwar years, he said. Another reason for cutting down on salesmen's expenses is the change in attitude toward "buying business" through extensive entertainment.

From the floor, various ideas on salesmen's expense were expressed by wholesalers from different sections of the West. Two distributors said that they had cut salesmen's travel costs by utilizing leased autos. Another said that the first step in reducing salesmen's expenses was a thorough analyzing of these expenses so that both management and the salesmen can get a clear picture of where the money is being spent and just where such money is working to produce business.

Helping Customers

"What are you doing to assist your dealers and contractors to develop better salesmen?" was the title of the second discussion panel Tuesday morning, with L. G. Berger, WESCO, as leader. Any attempt to help customers at salesmen-customer level must originate with the wholesaler sales management. The development of appliance distributor salesmen who are smart merchandisers will be necessary if these men are to aid their dealers in the development of good retail selling practices.

The subject led to a floor discussion of the qualities of a good wholesale salesman. Dependability, promptness, and a sense of responsibility to both the customer and the wholesale house, were brought out as prime requisites.

A manufacturer's representative said that he felt wholesalers need to put more romance into the salesman's interpretation of his work. Another said that the efficiency of supply selling will increase as salesmen learn more about the products they are selling and their use to the customer. A wholesaler suggested that the supply salesman is not carrying enough samples, that the trend since the beginning of the war has been away from samples. He told of his concern's development of a salesman's kit which is changed regularly. A wholesaler pointed out that salesmen's efficiency could be increased by developing closer relationships with the credit department, and by giving them regular bulletins to keep them up-to-date on new products and new developments.

The prosperous electrical supplies distributing industry that exists today is a golden goose of the industry's own creation, said Charles G. Pyle, managing director of NAED, visiting from New York. But this golden goose must be fed and supported or the goose will be cooked. Selling and more selling, plus an increase in efficiency of operation, is the solution to keeping the golden goose healthy and provident. In a review of some of the NAED's national activities, Pyle said that appliance manufacturers had been petitioned successfully for higher margins. A booklet to go to wholesalers showing them and their employees the importance of their place in industry, has been prepared by national NAED headquarters. More than 65,000 electrical salesmen have been trained through the EEI-NAED training program, Pyle reported.

In the closing panel of the convention, electric utility representatives were invited to present the plans for development of electric load in their areas. O. R. Doerr, vice-president, PG and E, saw a bright picture for appliances in northern California during 1950. He disclosed that the postwar addition of 2,181,000 hp. to the PG and E system by 1951 will approximately double the 1940 capacity. The PG and E program for 1950 includes extensive promotion of adequate wiring, home lighting, and range and water heater sales, Doerr said.

Reporting for Southern California Edison Co., Henry Rice said that Edison's territory had received 45% of the state's population growth since 1940, and that it represented about 5% of the national buying power. There are more than 430,000 major appliances needed in that territory right now by the 205,202 new homes that have been connected since 1945 . . . a market of approximately $103,000,000 for the 800 dealers serving the area. In looking to 1950, Rice said that he felt there was a need for more emphasis on point-of-sale selling.

H. C. Dillon of the San Diego Gas & Electric Co. reviewed the electrical activity in that utility's territory. That

Berger Seigert Robertson Wiegenstein

company will continue to be active in promoting the use of electricity, using the bureau as outlet for its promotions. He said that 90% of all the new homes in San Diego County were going all-electric, and that there was now a 48% range saturation in areas ouside the gas lines. Electric cooking schools and a lamp contest were among the immediate promotions outlined.

Activities of California Electric Power Co. were described by D. B. Wheelock, vice-president. As representative of the only utility in the group actively merchandising appliances, Wheelock explained the problems in building load in the wide area, low population density territory of his company. He said that direct sales by the utility can be one of the best methods of building good customer relations. His company expects to sell 600 ranges during 1950, with another 400 being sold by the appliance retailers.

Next to Arrowhead

At the annual elections of the Pacific Zone, the member wholesalers elected Fred G. Goss, Electric Supplies Distributing Co., San Diego, to be chairman for the coming year, succeeding W. M. Jewell, WESCO, Seattle. R. A. Balzari, secretary, announced that the next meeting of the zone would be held May 8, 9 and 10 at Arrowhead Hot Springs, Calif.

Electric Clubs

Consulting cable engineer of Anaconda Wire & Cable Co., S. J. Rosch, told members about the miracles of modern industrial research at the Oct. 24 meeting of the Electric Club of Los Angeles . . . Department of Water & Power Day on Oct. 31 featured Howard L. Holtzendorff, executive director of the City of Los Angeles Housing Authority. Club held its golf tournament and dinner program on Nov. 7 and Old-Timer's Day on Nov. 21.

East Bay club members heard about the organization of Oakland's city government from Hilliard Wilson, administrative assistant to the city manager, at their Nov. 21 meeting in Oakland . . . Golf party was on Dec. 2.

Prefaced with remarks by Frank Falge, manager, Pacific Sales District, General Electric lamp department, a 30-minute G-E produced film, *Light in Your Life*, showing modern-day lighting, was shown to San Francisco electric club members on Oct. 24 . . . Following month Dr. Vincent Salmon of Stanford Research Institute was programmed with a talk on "Sonics and Science in Modern Living" . . . The club's annual Arthur E. Rowe Kiddies Christmas Party will be on Dec. 19.

NECA

In the biggest election campaign in many years, Edward J. Vanderlinde, prominent Rochester, N. Y., electrical contractor, was swept into the presidency of National Electrical Contractors Assn. at the annual convention at Houston, Texas, Nov. 2-11. The administration candidate, Don Clayton of Birmingham, Ala., had been persuaded to run when E. C. Carlson, Youngstown, chairman of the IBEW employers section, withdrew. Clayton has been vice-president from District 3 for many years. Vanderlinde had served as governor of the Rochester Chapter, never holding a national executive office. However, he and his sponsors, a number of chapters throughout the country, campaigned vigorously for him as a means of bringing changes to the administration and its policies.

Another upset was the unseating of J. Norman Pierce of Chicago, who had held the District 4 vice-presidency continuously for years. He was replaced by Leon J. Granger of Hammond, Ind., in a surprise vote from outside of Chicago.

In the District 6 election for vice-president, J. D. O'Connor, Lupen & Hawley, Sacramento, was elected without contest, he having been agreed upon quite generally in meetings of the California Conference of NECA chapters and with approval of other District 6 chapters in the Northwest. E. L. Buttner, Scott-Buttner Co., Oakland, had been serving out the term of J. B. Shamel, Los Angeles, who resigned, until a successor could be elected. Buttner retains the post of labor relations committeeman from District 6. J. Everett Collier of Denver was elected vice-president again for District 8.

The Houston convention was the biggest and best NECA convention in its history. Some 60 members, managers and officers attended from chapters in District 6, the Pacific Coast district, and District 8, the Rocky Mountain district.

W. J. Varley, manager, San Francisco chapter, was named the chairman of the chapter managers institute, the first time the chairmanship has come to a Western manager.

IES

Color expert Norman F. Barnes from G-E, Schenectady, recently presented a talk on "Color Facts and Fantasies," with displays and special color equipment. Both the Oregon Section and Washington State Chapter of IES and the Electric Club of Los Angeles heard Barnes tell about the scientific and popular aspects of color, definitions and color mixing theories.

Light and vision were discussed by Dr. Charles Brooks of Napa, Calif., at Mother Lode Chapter's first meeting under its new officers . . . On Nov. 17 Robert G. Dummel, district manager and lighting engineer of Holophane Co., told members of a means of designing and evaluating lighting systems from the standpoint of brightness engineering . . . Information on color by John Boylin, Department of Fine Arts, University of Southern California, was scheduled for the Dec. 9 meeting.

By popular demand the Oregon Section had a return engagement of its Information Please program, with questions on lighting problems to stump the experts. Sam Sposito was quizmaster for the Nov. 9 meeting in Portland.

In November the Washington State Chapter met in Seattle to hear an architects' forum . . . Joint meeting with AIEE in Tacoma was scheduled for Dec. 6.

Southern California Section heard a report by southern California delegates on the 1949 National Technical Conference and a progress report by the conference executive committee at a recent meeting in Los Angeles.

EMEA

Low voltage hazards in the home, and the effect of electric shock on the human system were the subjects of talks presented before the Nov. 8 joint meeting of the EMEA and the Southern California Industrial Safety Society in Los Angeles. A display of hot-line tools and a colored motion picture showing their use on high-voltage lines were also presented. Members of the EMEA nominating committee—H. Bush, H. Ledeboer, C. Miller, C. Hone, and E. Lawrence—were announced, and one nomination accepted from the floor. The committee will report in December, and elections will be held in January. President H. M. Eversz announced that the 1950 industrial show will be held in the Shrine Auditorium March 15-18. Application-contracts with floor plan and complete detailed information are available, and exhibitors are urged to make early reservation of exhibit space.

General Electric Co. recently invited Northern California EMEA members on a trip to the G-E manufacturing distribution transformers plant and wire manufacturing plant in Oakland.

ELECTRICAL WEST

Sales Guide

News Letter

FOR THE ELECTRICAL MERCHANT OF THE WEST

December 1940

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Christmas clean out

Well the buying spurt after the strikes were over should help almost everyone to clean out inventory for the start of a new year. Certainly the suppliers stocks of refrigerators, television sets, radio-phono consoles, and table appliances were cleaned out long before Christmas. One or two of the companies whose steel came from some of the first to fall to the new contracts were back in production early and even trickled some stock Westward.

and to Market

This cleanout should make the markets, at Chicago, Jan. 9-20, and San Francisco Merchandise Mart, Feb. 6-10, well attended by eager buyers. Should also help avoid last Jan.-Feb. slump which cut back spring appliance production to make summer shortages. In fact the outlook for 1950 is healthy.

Jumps gun

But it'll be competitive, no foolin'. For instance, Crosley is out after the No. 1 spot in refrigerator and appliance sales and makes no bones about it. Sprang its 1950 line in huge meetings across country, ending at Seattle, San Francisco and Los Angeles at which quiet strategist W. A. Blees, Avco vice-president and Crosley sales manager, beat competition to it on the first round.

Auto tactics

Blees and troupe introduced 60 days ahead of others its 1950 line, including some improved Shelvadors with a $40 below 1949 comparable model price, a line of steel kitchen cabinets, sinks, a garbage disposer, table top 40-gal. water heater and a full line of home and farm freezers. Also television and radio models. So Crosley dealers are selling next year's models now, will clear the stocks in summer when demand is good, get the new 1951 models early for a repeat next winter. Crosley broke precedent again with Sunday meetings; 400 dealers in Seattle at the civic auditorium; 1,200 at Veterans Memorial auditorium in San Francisco; 800 at Shrine auditorium, Los Angeles. See story next month for details.

NARDA program

National Appliance & Radio Dealers Assn. will hold a big annual meeting in Chicago's Congress Hotel during market week, Jan. 15-17. Has some big names on its program, including Jim Nance of Hotpoint, Carl Sorby of Roper, Walter Daily of Lewyt as well as dealers and distributors. Will have open forum conferences and sessions addressed by leaders in industry branches.

A small device, that will operate in any washtub, which stirs up the water by high frequency sound waves, has proved a successful washing machine and soon will be manufactured and marketed by an Australian company, Excell and Jones of Melbourne. In tests the sound waves shook dirt out of cuffs and collars in 10 minutes. The machine, powered by an 110-volt electromagnet from house current, stands 16 inches high, 7½ inches in diameter. Watch for pictures next issue.

Sonic washer

Returned from Hawaii, Howard Scaife, Hotpoint regional manager, reports business surprisingly good despite the shortages caused by the strike. Dealers seem to have merchandise even if the distributors are cleaned out. Some new merchandise has begun to move in with the ships.

Hawaii recovers

A. Roy Moore has been named supervisor of electrical dealers' representatives in Public Service Co. of Colorado's Dealers' and Builders' department. Roy G. Munroe announces. He fills the place made vacant by the death Oct. 27 of veteran Jack Connors. Moore has been a crack salesman for years in the Domestic Appliance department, will now assist dealers to sell more.

Salesman's help

Paul Rice Co., direct factory distributors, has taken on the Orley line of refrigerators and home freezers which will give dealers longer discounts at lower prices, says Rice. The 9 cu.ft. models list at $249.95 for standard to $289.95 for master deluxe. Freezers are $249.95 for 7½ cu.ft.; $399.95 for 16 cu.ft. Rice also distributes Bendix radios and automatic washers.

Goes direct

Changes in Westinghouse appliance distribution in San Diego--Distributors Inc., organized locally with Gene Cramer as manager, will handle all lines of major appliances including radio and TV. Electrical Supplies Distributing Co., long a Westinghouse agent jobber, will continue to distribute electric housewares of Westinghouse as well as their other lines, including Zenith.

Changes

Nash-Kelvinator shifted its Western men to fill the gap made by the death of its late C. J. Bachman. Ed Barnes, former zone manager in Los Angeles, now is Pacific Coast manager, Oakland. John Downing, zone sales manager, moves up to zone manager and Nels Barnett has moved from San Diego to be sales manager. Bob Liesendahl becomes San Diego resident manager.

Shift

As this goes to press the big show is on in San Diego, the annual Electrical Exposition, this time back in old haunts but expanded into adjoining buildings, approached through a Christmas Tree lane of decorated trees. Details and pictures of this big event of Bureau of Radio & Electrical Appliances will be reported next month. . . Date for the winter sales conference has been set for Friday, Jan. 27 at the convention center in Balboa Park. . . Two new sales courses opened in November--a basic sales training course and a new one on practical sales psychology. May be a TV course later.

Show's on

Backing up dealer selling for a big Christmas campaign on all appliances are heavy barrages of advertising by Utah Power & Light Co. and Western Colorado Power Co. A special edition of the Electro-Dealer tells dealers the schedules, the radio and TV broadcasts, shows and reproductions of the ads, bill boards and direct mail pieces used and tells them to go to it.

Heavy promotion

An all-electric kitchen will be used for appliance demonstrations at the new offices of Sacramento Municipal Utility District, at 21st and K. The District has also announced a new water heater registration plan, allowing an 8 mill rate for water heaters of approved specifications. Dealers will have stickers to put on water heaters of approved types for the low rate.

To show 'em

Miscellaneous--New postal rates proposed will up direct mail costs. Injustice is that tax exempt coops will still get the 1¢ rate while you pay 1½ or 2¢ for circulars with ads. . . The Fair Labor Standards Act for upping minimum wage rates to 75¢ an hr. wont apply to any retailers except chains operating interstate, but will hit wholesalers. . . Fire was caused in operating a dealer's window in New Jersey by sunlight through a TV magnifying lens. . . The ECA report checklist of manufactured products which European nations hope to sell more of in this country includes several electrical appliances. . . Maybe Congress will do something about coop taxation now that many farmer members are being tracked down for back taxes on "dividends" they never really got except on the books. Excise tax repeal may come to stimulate business and make employment. . . Attendance at the Los Angeles TV Exposition, put on by Southern California Radio & Electrical Appliance Assn. totalled 46,874, all paid admissions.

Briefs

Murray Corp. of America, steel fabricator and producer of automotive bodies, is entering the home appliance field early in 1950 with a full line of Murray electric and gas ranges, matched steel kitchens, cabinet-sinks and base wall cabinets. First showings will be at Chicago's Merchandise Mart in January. Products will be marketed through appliance distributors and backed with national ads and publicity campaigns.

Expanding

Apex's latest 15½-lb. cylinder cleaner has a disposable paper dust bag and is finished in bright chromium plate with maroon trim. The model is a redesigned version of an earlier cleaner.

New look

Add to TV models: Emerson's new 12½-in. console model, listing at $279.50. . . DuMont's 12½-in. console called the Canterbury with FM radio and record player attachment. . . Magnavox's table model with 12½-in. screen in mahogany at $239.50 and in blond finish at $249.50. . . Motorola's latest 16-in. TV console with double "Built-In-Tenna."

More in video

Cory Corp., in addition to its coffee brewers, circulators, heaters, etc., is now out with an electric dishwasher to be known as the Cory Matic Maid. Weighs 25 lbs. and operates on the drainboard. Electric motor propels a centrifugal pump which sprays two rotating streams of hot water at different angles. Washes for a service of four in one load. Development work on the dishwasher was done by Applied Products of Los Angeles and will temporarily be manufactured in California. Dealer and distributor meetings started during November.

Portable dishwasher

Columbia Distributing Corp., Seattle, is the new distributor of Admiral refrigerators, ranges, radio-phono and TV receivers for the entire Western Washington territory.

Adds line

Buy-Ways to Success is the theme for San Francisco's Western Winter Market from Feb. 6-10, reports Frank K. Runyan, Mart president.

Mart flashes

Edison Electric Institute's latest booklets: Patterns for Parties, 32 pages, illustrated, with novel ideas for parties at home combined with advantages of using electrical appliances for entertaining. . . Dollars or Doughnuts, a commercial electric cooking brochure for electric utilities, listing reasons why commercial cooking is advantageous to both utility and food service operator. . . Facts of Light, a 32-page brochure, telling how electric companies are building net revenues in the commercial, residential and industrial lighting markets through planned lighting. — Off the press

Monitor has set up a new distributorship—Monitor Engineering & Sales Co.—in Los Angeles to handle the California distribution of its new aerator washer. Monty Beckman, former merchandiser of Iron Fireman Stokers, is manager. — Set up

In San Francisco October TV sales climbed 48% above the previous month to reach 1,765 units and total sales of 16,500. Dealers had only one problem—short supply. . . At October's end Los Angeles reported a total of 251,041 sets sold, averaging five viewers to each set. Past month's big increase was attributed to the recent National TV-Radio Exposition put on by Southern California Radio & Electrical Appliance Assn., plus football telecasts, more and better programs. — Going strong

TV dealers and salesmen on the coast will find up-to-the-minute TV news in the new monthly bulletin put out by the television committee of PCEA, the first one just released. Concisely written, the television bulletin answers controversial issues, gives general sales info, current developments and touches on technical aspects of video. — Report on TV

O. B. Wilt Co., at space 559 in San Francisco's Mart, has taken on representation for Luxor Co. of Dallas, manufacturer of a new portable 110-volt thermostically controlled electric clothes dryer. — Dryer Rep.

Lapkin-Myers Co., San Francisco and Fresno, have become distributors for Westinghouse traffic appliances in northern California. — Note

Hoffman Sales Corp. recently moved its office from San Francisco's Merchandise Mart to 1339 Mission St., where it has set up offices, warehouse and a TV service department including installation and service and a fleet of trucks. Will still keep its showroom at space 441 in the Mart. Walter Epstein, district manager, will have charge of both quarters. Kirk Torney, formerly with Torney-Bush Television Co. of San Carlos, Calif., has been named sales manager. — Move

Toastswell has a new electric bun and food warmer with removable element and basket, adjustable moisture control vent. Made of aluminum with bakelite handles and feet. Retails at $5.95. . . For the holiday season Toastswell is using national ads to promote its $18.95 two-slice toaster, offering suggested tie-in ads and window display contest for dealers. — Bun warmer

Through national ads Hamilton Mfg. Co. is offering a free 16-page booklet on clothes drying and home laundry planning. Printed with illustrations, the booklet explains the construction, operation and features of the Hamilton dryer. — Free info

Thor is showing its new 1950 line of automatic ironers, wringer washers and combo automatic dishwashers and clotheswashers at the Mart in San Francisco. — On display

ELECTRICAL WEST

Sales Guide

FOR THE ELECTRICAL MERCHANT OF THE WEST © DECEMBER, 1949

Finding Inventory Shortages

J. E. Bedford

Assistant Professor of Merchandising, Armstrong College

INVENTORY shortages are revealed once a year when the year-end physical stock count is made. **But** the causes that contribute to this loss of profits are going on every day the appliance store is open.

When the final result of the inventory is computed some appliance dealers begin to worry about the loss. It is mighty discouraging to see part of the year's anticipated profits going out the window due to an inventory shortage. All of this can be avoided by establishing some checks and balances to eliminate all inventory losses that may develop.

One appliance store completed its year-end inventory and discovered that $3,000 of its anticipated profits were absorbed in an inventory shortage. Investigation revealed that the shortage had been developing all year. It was not something that could have been avoided but, if everything had been handled properly during the year, false hopes for large profits wouldn't have been built.

All during the year whenever a trade-in was taken into stock the allowance was figured as the actual value of the used merchandise. Then when it was sold no accounting was made in the difference between the trade-in valuation and the selling price realized.

For instance, a radio carried in stock with a retail selling price of $300 was sold for $250 plus a trade-in of $50 for an old radio. The appliance dealer then had $250 in cash and a used radio to replace his former $300 inventory. When the used radio was sold for $10 he should have made an offsetting entry in his inventory account to show this loss on the sale of his trade-ins.

He didn't make any entry when he sold his trade-in stock. Many times it is good business to suffer a loss on the sale of used appliances to make a sale of a new appliance. However, unless some markdown is taken for the loss on the liquidation of the used item, a false picture of profits is drawn.

When this false profit picture has been used as the basis for making operation plans during the year, the net profit can't be as attractive as had been planned. It can go so far that the dealer will end up with an actual loss instead of a profit. This type of planning, based on false figures, can have disastrous results.

To avoid the dangers that can result from inventory shortages here are seven points to check in an appliance store. Answering these questions will not stop all inventory loss, but it will point the way to corrective action if a shortage does develop.

1. Was everything counted when the inventory was taken?

This is an obvious cause of inventory shortages, but it does happen in the best operated appliance stores. When the results reveal a difference between the book inventory and the physical count this is the first logical question to ask and answer. If plans were carefully made and executed for the inventory the possibility of this happening will be eliminated.

Some appliance dealers have found that if they make and follow a floor plan in counting their stock they don't omit some section of the store. By numbering the inventory listing sheets with serial numbers they have a check on any that might be missing. Then if any of the sheets are missing or some section wasn't counted, a complete recount of the stock isn't necessary.

2. Is every shipment received carefully checked when it arrives at the store?

From the time the merchandise arrives at the store until it leaves for a customer's home there is a possibility of loss. Checking the delivery against the freight bill will reveal any shortages that should be charged to the common carrier.

Another possibility of loss is when the factory may make a mistake in crating. Most shipments won't cause any trouble on this count, but there may be an occasional slip-up in marking the crates,

For instance, one store received a shipment of refrigerators and the crates were marked with the deluxe model number. This tallied with the invoice and order so they were checked into stock as the deluxe boxes.

However, when the shipment was uncrated for delivery, it was found that an error had been made. All of this shipment were the standard model. By filing a claim against the factory, the store was able to obtain full credit for the difference and thus avoid an inventory shortage. Some orders have a time limit beyond which the claim for wrong merchandise can't be filed so it is best to check on arrival.

3. Do you have good control over the warehouse and stockroom?

One appliance dealer discovered that he was losing his profits through the back door. His stockroom door was often left open and his small electrical items and auto radios were disappearing down the alley. It wasn't hard for someone so inclined to slip into the back room and leave with an auto radio or an electric mixer without detection.

When deliveries were made from the warehouse to customers' homes in another appliance dealer's organization, there was no control. The delivery truck would come to the store, get the key to the warehouse and the address where the appliance was to be delivered, and leave for the warehouse. When the inventory shortage was being investigated, this lack of control was discovered and also where the dollars of profit had gone during the past year.

Another stock room loss that may result in an inventory shortage may be parts. Some appliance dealers carry parts in one department for resale to customers. If these parts are needed in the service department, they are charged from one department to the other on the books. If the proper records aren't maintained in the store, parts will be taken and used with a resulting inventory shortage in one department and an overage in another.

4. Are you watching for shop lifters in your store?

Recent reports released by law enforcement authorities reveal that shoplifting is on the increase. Some sections are troubled with this profit disease more than others, but once the appliance store is marked as an easy mark by these professionals, inventory losses will mount.

Keeping someone on the sales floor at all times will help keep this type of inventory loss at a minimum. Watching suspicious characters and keeping small valuable items in a safe place will help keep the profits in the store. If the proper precautions aren't being observed for detecting shoplifters, this may be a contributing cause for inventory shortages in the appliance store.

5. Are you taking and recording all markdowns?

False profits are built up quickly if an appliance store fails to record the necessary markdowns. Earlier in this article an instance was cited where anticipated profits were lost by the failure of the store to keep everything up to date on stock valuations. By recording all markdowns accurately and promptly, the planning figures will be maintained correctly. This should help all appliance dealers operate their stores more profitably.

6. Have you had your books audited recently?

Bringing in an outside auditor to go over the books is an expense. It can seem like a waste of money, especially when the auditor doesn't discover anything wrong. **But,** if anything does need treatment, this "doctor of records" will quickly discover it in his accounting check-up.

In addition to discovering funds that have been misappropriated and fictitious accounts that have been set up to balance the books, an audit can help the bookkeeper improve his methods. Partnerships should be audited annually for the protection of both partners and as a means of taking advantage of improved accounting methods.

7. Have you removed all temptations that might result in an employee theft?

When the opportunity presents itself and the employee has the need and the inclination, an inventory loss may be the result. With the high cost of living today, many employees have the need, but not the opportunity or the inclination. Opportunity presents itself when controls are not established and maintained in the appliance store.

One appliance dealer kept no permanent record of his appliances that were on demonstration. When an investigation was launched to discover the cause of his inventory shortage, it revealed that one of his employees was taking major appliances out for demonstration without any record being made of the transaction. Occasionally he didn't return the item on demonstration to the store or bring in any money to pay for it.

This inventory loss was eliminated for the future by removing the employee from the pay roll. However, this disagreeable task could have been avoided if controls had been established and maintained before the loss developed. It would have saved an employee for the dealer and several hundred dollars in profit.

Being able to answer these seven questions "yes" will not insure an accurate inventory with no losses. **But** it will point the way to an investigation of the causes when an inventory shortage does develop. Even if there isn't a shortage, the check-up will reveal any weak spots in store procedure. It will point the way to improved appliance store operations and more profits at the end of the year.

Furniture Dealers' President S. J. Neely tells dealer and salesmen audience "Why I am a Salesman" to inspire emulation

DENVER DEALERS' HELPING HAND

HOW home freezers were promoted and sold in the Denver area well illustrates the operation of the Denver Plan under which both dealers and Public Service Co. of Colorado campaign the market together. The same technique is being applied this fall to the certified lamp, the electric ironer and electric bed covering.

A story on the fundamental reasoning behind the Denver Plan, the basis on which it is built by G. B. Buck, vice-president and general commercial manager, and its selective approach to the low-customer-acceptance devices, has long been promised and some day will be given in detail. But the way that portion of it works which deals with assistance to dealers through a coordinated promotion program can be seen in action in the home freezer drive recently completed.

To assure dealers that the dealers' and builders' department, which is headed by the company's oldest salesman and most experienced, Roy G. Munroe, acts fully for and with the dealers, this department is kept completely separate from the company's domestic appliance department with its separate staff of territory sales representatives. Under the plan, the company specializes only on low-acceptance but good load-building appliances in its direct sales. Even these it strives to sell in such a way as to build dealer sales of the same appliances to from three to five times as many as its own sales. No longer does the company run a large retail store handling all appliances. It concentrates on seasonal intensified campaigns on these appliances needing the push of company effort.

During these seasonal campaigns the territory sales representatives of the domestic appliance department make door-to-door explanations and demonstrations and sales solicitation on the particular appliance being pushed. Company advertising and floor and window displays feature this device and pave the way for the sales efforts of both company and dealer salesmen. All publicity is dealer slanted, with illustrations and copy never referring to any one manufacturer's make, but stressing such phrases as "Home food freezers on display at dealers' stores," and "See home food freezers, on display at dealers' stores."

The dealers' and builders' department is charged with the responsibility of cooperating with all of the appliance dealers, wholesalers, manufacturers' representatives, building and wiring contractors and architects, as well as securing their cooperation, in turn, to the end that the maximum impact be made upon the consuming public, through concerted effort.

Well in advance of the inauguration of each intensive effort upon some particular appliance, the dealers' and builders' department men call upon dealers, advising them of the company's plans, and soliciting their participation. First the distributors and manufacturers' representatives are contacted, and the campaign plans outlined. Their suggestions are solicited, and assistance is tendered in contacting and informing and enthusing their respective dealers.

Following this and supplementing personal calls, a meeting of dealers is called, with interested wholesalers helping to stir up enthusiasm. The next phase is usually a series of educational meetings for salesmen, followed by weekly confidential reports of the success of individual dealers secured by dealers' and builders' department men.

At intervals bulletins are issued to all dealers and distributors, giving total reported results accomplished. This is done that each dealer may compare his own results with the totals reported in the area. Care is taken to keep each individual dealer's figures confidential, quoting only such individual results and incidents as he authorizes for the common good. Such over-all reports to dealers include statistics on not only the particular device then being pushed, but also statistics on all the other appliances upon which campaigns were conducted during previous seasons of the year.

Typical was the campaign on the home freezer, commencing in June. Jack T. Connors, supervisor of electrical dealers' representatives in the dealers' and builders' department, called a luncheon meeting of all distributors of home freezers in the Denver district. At this meeting the proposed campaign was outlined, company newspaper advertisements promoting the home freezer and the use of frozen foods were passed around, and the company's policy of dealer cooperation was reemphasized by G. B. Buck, vice-president and general commercial manager.

Each distributor agreed to urge his dealers to participate through tie-ins

with the company's newspaper ads, through special window and floor displays, and through extra effort on the part of his sales people. With Public Service company's advertising department spearheading this move, a special eight-page home freezer section in a Denver newspaper was prepared. This section contained home freezer advertisements by the various manufacturers, distributors and dealers, and a number of articles featuring the use of frozen foods and the home freezer. It was followed by a four-page section in another Denver newspaper later.

A dinner meeting of Denver home freezer dealers was then held. At this meeting a past president of the National Food Locker Men's Assn. gave a most informative lecture on the proper preparation of foods for freezing and mistakes to be avoided. A professor from Colorado A & M College then addressed the dealers on food chemistry as pertaining to the use of the home freezer. Connors explained the plans of the utility for putting on a series of sales and demonstration lecture classes for the home freezer sales people working for the various dealers to supplement classes which might be conducted by the various distributors and dealers themselves.

These sales training classes for sales people were conducted in the auditorium of the company. The Vocational Education Department of the Denver public schools was pleased to sponsor these classes and to issue certificates of completion to those finishing the course.

The first lecture was given on the evening of Aug. 9, the subject being "How to Sell the Home Freezer," and the lecturer being an outstanding speaker and salesman with a national record as a successful home freezer salesman. A sound movie by Borden & Busse demonstrated how to win a sales argument. Lecture No. 2 was given by the president of the Rocky Mountain Retail Furniture Dealers' Assn. on the subject "Why I Am a Salesman." Borden & Busse again appeared upon the screen giving the "autopsy of a lost sale." The program for the concluding meeting included an explanation of "what the opportunity school is doing to help you sell the housewife," by an official of the Denver public schools, and a lecture on sales helps in explaining how to use the home freezer by Mrs. Vera Carter Ault, home service director for Public Service Co. of Colorado. A sound movie in color, *Freezing Fruits and Vegetables*, helped to illustrate the lecture.

Commencing June 20, the sales representatives of the domestic appliance department of the company made 5,297 calls, door-to-door, explaining the advantages of owning a home freezer and then soliciting purchases.

"The dealers of Denver are realizing more and more, as the months go by," says Munroe, "that their own store sales of the devices being promoted at any one particular time by the company salesmen are affected most wonderfully by these door-to-door calls." Dealers are being caused by the dealers' and builders' department contact men to note the jump in store sales on a device during the period when the company's men are soliciting sales through thousands of calls.

During the period of June 20 to Sept. 20, the dealers in Denver reported 321 sales of various makes of home freezers. But the momentum of this compaign carried on for months, after the company's own principal sales drive shifted to the ironing machine, or the electric blanket, or thence to the certified lamp. Total freezer sales by Nov. 7 by dealers had reached 648. E. H. Steil, electrical dealers' representative, followed a similar pattern of distributor and dealer contacts and preparation so that they could cash in on the hundreds of door-to-door calls made by the company's electric ironer salesmen. James A. Stockett, lighting dealers' representative, in turn has prepared dealers to sell CLM lamps in the campaign which runs until Christmas. Dealers sold 879 ironers, 550 blankets, 5,621 CLM lamps, 876 electric water heaters up to Nov. 7, a much greater number than would have been sold without these promotions. In many areas where no such work is done there are no CLM lamps sold at all. Several dealers have stated frankly the more men the company puts out door-to-door on such a cooperative basis, the greater they benefit in volume of sales.

Keeping The Gals Up To Date

ALTHOUGH utility home economists have a pretty full schedule *teaching* the electric story to their customers, the fast-moving industry dictates that every once in awhile they too must take a breather and be *taught* about new developments, company plans, and ideas for their work.

In Salt Lake City the Utah Power & Light Co. and Western Colorado Power Co. found the best way to "teach the teachers" was to call a three-day conference and training meeting for all its home economists.

Starting off with the utility's plans for the year, M. L. Cummings, advertising and sales promotion director, described the special ads to be used on electrical gifts for Christmas, announced that the company will continue its television programs on KDYL and expand to do a program once each week on the new KSL station. Both programs, the home economists were told, would feature all-electric kitchens and laundries.

J. F. McAllister, residential sales director, stressed cooperation with dealers and company personnel. He pointed to the privilege home economists have of introducing new things to the homemaker and helping her understand how the service the company sells helps her enjoy her work.

For work with schools and homemaker groups the girls were shown two films, *This is the Way*, a Westinghouse short on the advantages of the automatic laundry, and *Grandma Goes*

Around Roy G. Munroe, superintendent, dealers' and builders' department, are his staff, including H. D. Taylor, Ralph Hanson, E. H. Steil, John Garvin, J. A. Stockett, S. J. Tinsley, the late Jack Connors, A. A. Roebke and A. M. Toppin. Their work is with electric and gas dealers, plumbers and contractors

BUY-WAYS TO SUCCESS!

Today's new values offer many buying opportunities. Prices and standards of quality have been adjusted to levels which can be considered normal from now on. Buyers can place orders now with the assurance that there is soundness in both value and quality. New lines, styles and values will be presented by over 2200 manufacturers of all kinds of home goods at the Western Winter Market in San Francisco, February 6 thru February 10.

WESTERN MERCHANDISE MART

The wholesale market center of Western America for furniture, home equipment and related goods

SAN FRANCISCO

Certified lamps were explained by Mike Fryer, Colonial Premier Lamp Co., as part of training for home economists of Utah Power & Light Co. and Western Colorado Power Co. during their recent three-day conference in Salt Lake City

to Town, a Frigidaire film on electric cooking.

As part of their training they visited the Walter B. Lloyd Distributing Co., where a factory representative explained the operation of the General Mills iron, steam attachment and toaster. Distributor representatives explained the features and operation of the Admiral range and refrigerator. At the invitation of the Strevell-Peterson Co., distributor, the girls watched an evening demonstration of the Philco-Electromaster range, by Neva Harbison, factory home economist.

Certified lamps, adequate home lighting and new developments in the lighting field were demonstrated by Mike Fryer of Colonial Premier Lamp Co.

From a demonstration of remodeling a table lamp to accommodate the new indirect lamp bulbs, explained by Thelma Lee, utility home economist of Rexburg, Idaho, the group decided to conduct a special activity in their divisions on home lighting and remodeling of lamps.

After visiting two new Revere homes furnished with all-electric kitchens, the group attended the annual convention of the Intermountain Electrical Assn. in Ogden, Utah.

San Diego Swarms with Lamp Salesmen

Salesmen came of age early in the game when San Diego Gas & Electric Co. decided to recruit youngsters between ages 8-15 to do some selling of lamp bulbs. Although interest was a little slow in getting started, it picked up fast when the young San Diegans got word of the wide assortment of prizes being given away. After the first few weeks more than 1,000 boys and girls were flocking to utility offices to get rules of the contest.

Coordinated by Alan J. McCutcheon, residential lighting representative, San Diego's Reddy Kilowatt lamp bulb contest, from Oct. 17 to Nov. 23, had the joint sponsorship of lamp bulb manufacturers, their San Diego distributors and the utility.

First rule for the youthful contestants was that they would compete only outside of school hours. Next step was a trip to the utility office to register and get a Reddy Kilowatt button, lighting guides and a supply of Reddy Kilowatt lamp bulb purchase certificates, with space for the contestant's name, district, number and wattage of lamps, total watts and the dealer's name. After signing the certificates the youngsters were armed to distribute their information and certificates to friends, neighbors and relatives. Customers were asked to take the purchase certificates to their dealer's store when buying bulbs. In turn the dealer validated the certificates and entered the quantity and wattage of each purchase.

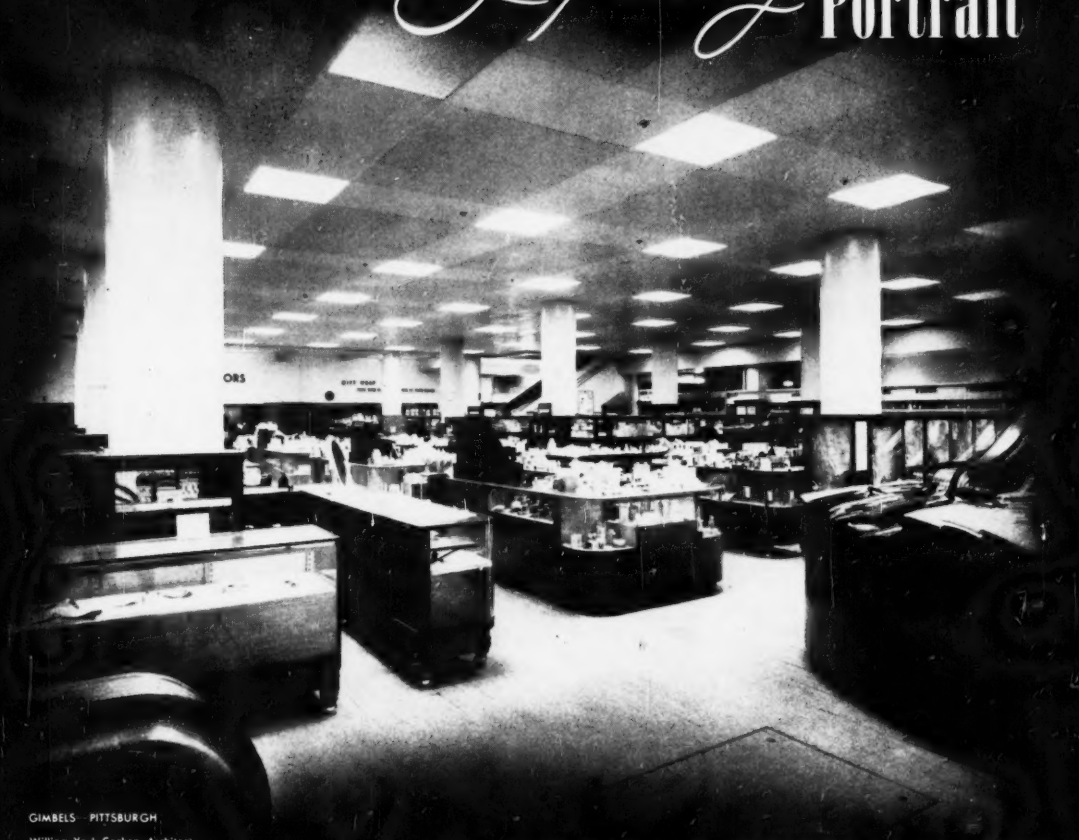
The certificates were then returned to the contestant who turned them into the utility office to receive one point per watt of lamps sold. These points could be turned in for progress prizes at any time during the contest and still be accumulated toward the grand prizes which were awarded at San Diego's 12th annual Electrical and Home Appliance Show on Nov. 26.

The wide variety of progress prizes —sports goods, dolls, jewelry for girls, appliances for gifts—were displayed on the floor and in the window of the utility office. Grand prize was an all-expense paid trip to Hollywood to the child having the highest number of points and his or her chaperon, plus dinner at the Brown Derby, a visit to Mutual Broadcasting Station KHJ and a personal audience with Red Ryder and Little Beaver. Other top prizes included a table model General Electric television set, portable radio, two bicycles, door chimes, toasters and Mixmasters.

Each Saturday morning contestants tuned in to Station KGB for a watt-by-watt description of the current winners, with McCutcheon reporting on latest contest results, interviewing contenders and their parents, talking with dealers and answering questions regarding the contest. Station KGB filled the airwaves with chain break announcements of contest news. Dealers advertised with window banners and colorful display cards.

● WITH an illustrated booklet, written in a snappy problem and answer style, Inland Empire Electrical Dealers Assn. has given its members a detailed version of the association's purpose and what it is doing about industry problems. Titled *What's the Big Idea*, the colorful booklet presents a report on IEEDA's policies and activities, pointing to such work as its news letter, seasonal trend indicators, sales analysis system, cost ratio studies, distress boards, salesmen selection bureau.

A Permaflector Lighting Portrait



GIMBELS — PITTSBURGH

William York Cocken: Architect — The Trimble Co.: General Contractors
C. W. Carter Elec. Construction Co.: Electrical Contractor

Here, in Gimbels newly designed first floor, fluorescent and incandescent silvered-glass Permaflectors produce "light for selling." Dramatic yet functional illumination is achieved with the 203 combination, ceiling recessed, fluorescent-incandescent units.

To transfer your creative lighting designs from "blueprint" to reality is relatively simple when you specify Pittsburgh Permaflector Lighting Equipment. Pittsburgh Reflector Company has the equipment and know-how required to give you efficient, economical illumination that exactly fills your needs—whether your plans call for fluorescent or incandescent light or a combination of both. You will find it worthwhile to discuss your problems with Pittsburgh Permaflector Engineers. Why not call or write today?

PITTSBURGH REFLECTOR COMPANY

406 OLIVER BUILDING • PITTSBURGH 22, PENNSYLVANIA

MANUFACTURERS OF FLUORESCENT & INCANDESCENT LIGHTING EQUIPMENT

Permaflector Lighting Engineers in All Principal Cities

PITTSBURGH PERMAFLECTOR LIGHTING EQUIPMENT IS DISTRIBUTED BY BETTER ELECTRICAL WHOLESALERS EVERYWHERE

WATCH THE NEW WESTINGHOUSE FLUORESCENT SUN LAMP

hit the ceiling!

Here's a totally new kind of sun lamp . . . a *fluorescent* sun lamp that offers you a new sales opportunity . . . the kind you haven't had in years! Here's why:

For the first time it's practical to provide indoor sunshine for a *whole room*—for people at work or play; thus this lamp is perfect for schools, offices, factories, homes, and amusement and recreation areas where everyone can now get a full measure of ultraviolet. That's a big-volume market! In addition, there's a huge market for this lamp in homes and private offices because it is ideal for quick individual sun tanning. High-intensity, *cool* exposures produce a *real tan* in a short time. The lamp has five times the efficiency and four times the life of the conventional sun lamp. And it costs less to buy and less to run!

It's an easy lamp to merchandise, too. There's nothing complicated about it. It's like any regular fluorescent lamp except that it produces ultraviolet light instead of light for seeing.

Rating	*Bulb length*	*Price*
20-watt	24 inches	$4.50
40-watt	48 inches	$7.00

WILL SELL MORE FIXTURES, TOO

Every time a Westinghouse fluorescent lamp is sold there's an opportunity to sell a fixture to go with it—and that means *more business* not only for lamp distributors and dealers but also for fixture manufacturers. So—get in on a good thing early! Be among the first to cash in on this exclusive Westinghouse development. Mail the coupon NOW.

Millions OF READERS

will be reached by Westinghouse advertising on this new product — all told, more than 35 million!

FOUR COLOR, FULL PAGE ADS.
IN AMERICA'S LEADING PUBLICATIONS — THE MAGAZINES YOUR CUSTOMERS READ AND RESPECT!

—*PLUS* FREE merchandising helps: 1) Envelope Enclosure, 2) Descriptive Folder, 3) Colorful Counter Cards. All in all—a full-scale, man-size promotion on a product that's a cinch to soar to the top in popular appeal. So, be first to cash in! Get in touch with your nearest Westinghouse District Office (listed below) . . . or mail the coupon NOW!

Now's the time
TO RIDE THE WESTINGHOUSE WAVE TO GREATER PROFITS

WESTINGHOUSE LAMP DISTRICT OFFICES:

BOSTON	10 High Street
CHAMBLEE, GA.	2260 Peachtree Industrial Blvd.
CHICAGO	20 N. Wacker Drive
NEW YORK	40 Wall Street
PHILADELPHIA	3001 Walnut Street
PITTSBURGH	419 Wood Street
SAN FRANCISCO	410 Bush Street
ST. LOUIS	411 N. 7th Street

WESTINGHOUSE ELECTRIC CORPORATION
Lamp Division, Bloomfield, N. J.

Rush me full details about the sensational new Westinghouse FLUORESCENT SUN LAMP.

Name .....

Company Name .....

Street .....

City and State ..... EW

TO BE OR NOT TO BE — A BUSINESS

OF vital importance to the electrical industry is a decision which the commissioners of the Los Angeles Department of Water & Power must make soon. Basically the decision boils down to this: "Is a municipal utility a business that must be run like a *business*, or is it a minimum civic service which, because it is a monopoly, needs no business promotion?

Committed by city charter to a survey each ten years, the board of commissioners again has had Ford, Bacon & Davis, a New York industrial engineering firm, make a check of the operations of both its water and power divisions. That report, in four volumes, ends with one volume of comments summarizing the findings and making 87 conclusions and 56 recommendations. Among the conclusions is one that seems to express the premise upon which the engineering firm makes its drastic recommendations to reorganize the business agent's division and cut its budget by $1,200,000. That premise is inferred in the following:

"Since about 1940 the department has become a monopoly in the supply of electricity to the city of Los Angeles with no competition except with natural gas for heating purposes. Natural gas has an economic appeal for heating purposes, it will become greater since more and more of the future electric supply must come from fuel-fired steam generation."

In the recommendations made by the engineering firm, a complete reorganization of the business agent's division was recommended, elimination of all of its promotional functions both on domestic appliance promotion and also in the development of new industrial business. The changes proposed would cut $1,200,000 from the 1948 budget figure of $1,800,000, leaving $600,000 for all commercial service to a property serving more than 650,000 customers.

The business agent's division would then consist of two simple sections, a general sales and service section and an office sales section. This would eliminate the commercial and industrial section headquarters group with its lighting advisory, commercial cooking and baking, industrial heat and private power plant staff and industrial development personnel and experts. One district supervisor in each of the department's offices would be expected to handle such demands as customers made for service or advice in these fields.

In the residential section similar elimination would take place, cutting out all sales promotion, dealer and plumber contact, adequate wiring promotion, kitchen planning, home economists, the Matchless Electric Home and its publicity activities, dealer sales training, participation in the appliance association, wiring allowances for ranges or water heaters, multiple housing contact, etc. The residential service would be cut to only such employees as necessary to answer phones, take applications, handle rate applications in the main and branch offices. The display department would be retained, but the advertising budget cut drastically.

No Action Taken Yet

The commissioners this time have not acted hurriedly on the FB&D recommendations. (The similar report ten years ago was used by an antagonistic board to purge the department of many persons who had opposed the mayor's election.) Before formally accepting the report it gave General Manager Samuel B. Morris and the heads of departments an opportunity to study the findings and to reply to the report in detail. These replies have been accepted with the report and are being made the subject of further study. It is in this that the board faces a decision as to whether it is operating a utility *business* or a minimum utility service such as sewage disposal or water supply.

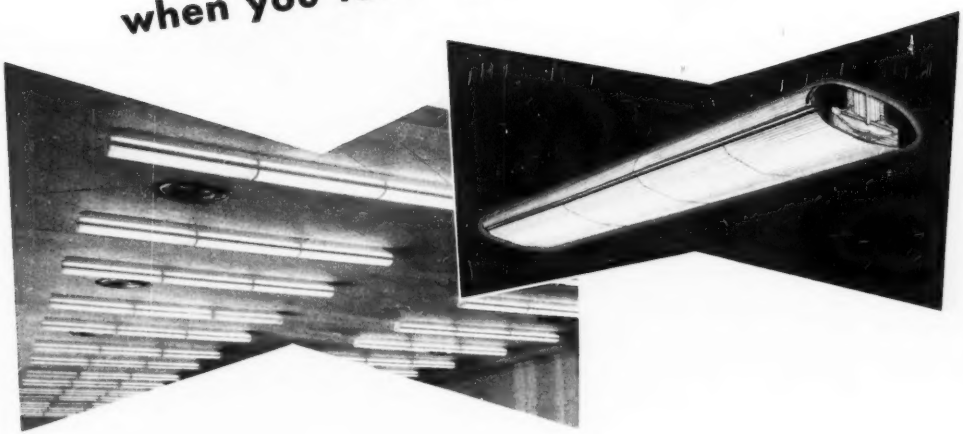
In answering the FB&D recommendations Morris replied that the type of business agent's division depends on the type of service and functions it is to perform. As for wiring allowances, the department had already eliminated range wiring allowances but water heater allowances should be continued until a proper degree of acceptance has been reached. Free service policies should not be changed so sharply as to affect public relations. As for the budget, $300,000 had already been cut in the 1949-50 budget, and advertising $27,000.

The department staff in its rebuttal also contends that the basis of comparison used by FB&D in adjudging that range and water promotion expense is too high in relation to cost of service at present rates and accomplishment in range and water heater saturation, is an unfair one. The engineers used a ratio of cost of the business agent's department to total revenue. But the department heads point to the 20 to 50% lower rates at which service is offered and claim that a fairer comparison would be of cost per customer. A survey of 46 utilities places its sales expense in the middle of similar costs of comparable private companies. As for saturation, the reply is made that kwh. use per residential customer during the past 15 years has increased from 600 to 1,600 and range and water heater saturation has quadrupled, which is much greater than the rate of increase of a large neighboring utility in the same time. (An independent survey of the rate of return to the department from range load shows a 6.63% return, water heater a 5.91%, even on oil cost generation.)

As for industrial expansion, the reply was made that the engineers' conclusions were absurd (e.g. that promotion of new industries is undesirable as there is but little industrial property available in Los Angeles), that of some 19,200 acres of zoned industrial area, only 10,650 are used by industry and this does not include industrial expansions possible in nearby agricultural areas. The replies also contend that there is still a potential of 2,000,000 kw. to be developed on the Colorado River and other sources of hydro in the Sierra, also that fuel costs have come down since the report was started.

There are many details of both the report and answers to its conclusions and recommendations that show the results of a difference of approach. To the electrical industry the decision of the board will determine whether the development of electrical living and electrical usage must be carried on without the help of the utility (indeed with some resistance from it as its staff is cut so that it will be unable to take care of even orders and minimum service) or whether, like all businesses the Department of Water & Power shall take its part in community development and business expansion. In the past the department has operated with a business viewpoint and in a manner similar to the best business-managed utilities. The industry, and its customers, have profited by the promotional activity it has conducted through the years.

when you talk lighting — remember;



SUNBEAM is the last word.

Sunbeam's policy of continually incorporating into its fixture designs the latest developments in illumination technology is your assurance of getting the last word in lighting. Next time you call for a luminaire that must fulfill a specific lighting need with maximum efficiency and maintenance ease, specify SUNBEAM. Illustrated is the H8080 series, specified and now being installed in the Senate and House Chambers of Congress, Washington, D. C.

Sunbeam Lighting Company, 777 East 14th Place, L. A., Calif.
Mfgrs. of BFK lighting fixtures

IEEDA Members Declare Ethics

A DECLARATION card designed further to promote legal merchandising policies in the Spokane area was distributed to members of the Inland Empire Electrical Dealers Assn. at the Spokane Chapter meeting on Nov. 1.

Prepared by Robert L. Wilkinson, executive secretary, the card (see Declaration) is to be used in dealers' stores to explain to customers why special discounts and similar concessions to certain customers constitute unfair discrimination.

Some 200 IEEDA members and guests attended the fall quarterly meeting, which also featured two prominent speakers on economic affairs and the election of officers.

Results of the election put Maage E. LaCounte, Columbia Electric & Mfg. Co., into the presidential position, succeeding W. J. Maghan; with Lloyd Distad, Lloyd's Sales & Service Co., vice-president; Lester Barnes, Maxwell's Inc., treasurer. Frank Tool, Washington Water Power Co., was re-elected secretary.

Barnes; E. S. Bergquist, Washington Electric Appliance Co.; Stanley Densow, Densow's and LaCounte as trustees will serve with John Boothe, Brown Johnston Co., and retiring President Maghan.

Explaining some of the nation's internal threats, W. Walter Williams, chairman of the National Committee for Economic Development, said we must recognize necessary expenses of government and realize that war and other situations have committed us to obligations that we cannot deny. However, he declared, freedom must be actuarially sound. With our heavy debts and our commitments internationally, we cannot have everything we might want in our domestic program, because we cannot afford it.

As remedies for our internal threat, Williams suggested more economic literacy, a better understanding of the part government should play in the economic life of the country and bringing government back to the local level where more control on expenditures can be exerted.

Edward F. Harris, assistant manager of the Spokane Taxpayers Assn., described the waste, extravagance and inefficiency in the operation of the federal government and made a strong appeal for the adoption of the Hoover Commission recommendations. Acceptance of these recommendations, Harris said, provides our opportunity to clean up the cesspools of waste and make tax saving estimated as high as $4,000,000,000 a year — an amount equal to the annual taxes paid by 16,700,000 average size American families earning $300 per month.

Declaration in the Sincere Conviction

THAT the according of special discounts or other concessions to certain customers or groups of customers for any reason whatsoever constitutes unfair discrimination and can only result in higher prices for those not so favored; and

THAT the prices established by the manufacturers of electrical goods sold by this store are the lowest possible consistent with the quality of service we wish to provide our customers: . . .

WE HEREBY DECLARE OUR INTENT

TO uphold the *Unfair Practices Act, Fair Trade Law, Robinson-Patman Act, Federal Trade Commission Act* and other state and federal statutes prohibiting discriminatory sales or misleading offerings in the protection of the public from unfair dealings and from the dangers of retail monopolies;

TO sell to all customers on an equal basis at our established prices; and

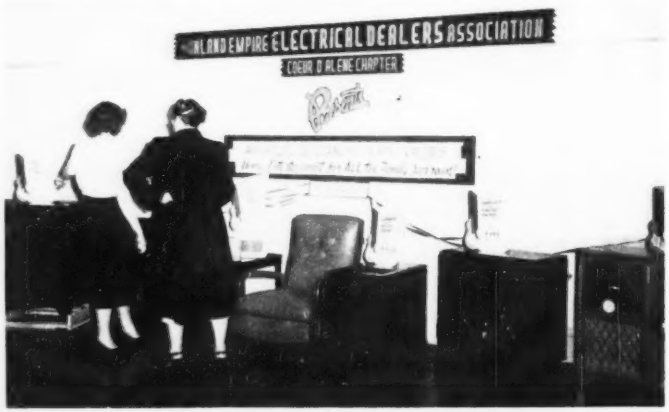
TO state at all times the true nature of price reductions on discontinued models, floor samples, shopworn or damaged items, or other articles on which we forego our profit to reduce prices for clearance or close-out purposes, avoiding, by so stating, any implication that we are rendering a special discount or price concession.

Dated ..... By .....

Store .....

● PAVING THE WAY for San Francisco's third television station, KRON, to go on the air, the San Francisco *Chronicle*, Northern California Electrical Bureau, TV distributors and station KRON joined forces in sponsoring a big TV and window display contest last month. To create store traffic, entry blanks were available only from dealers. Twelve TV sets were donated by manufacturers and awarded to different age groups. An additional set was donated in the name of each winner to a church, hospital or school. NCEB offered $200 in prizes to TV dealers and display men for window displays, installed for at least one week, showing one or more TV sets, and using the theme, "Why Every Home Should Have a Television Set."

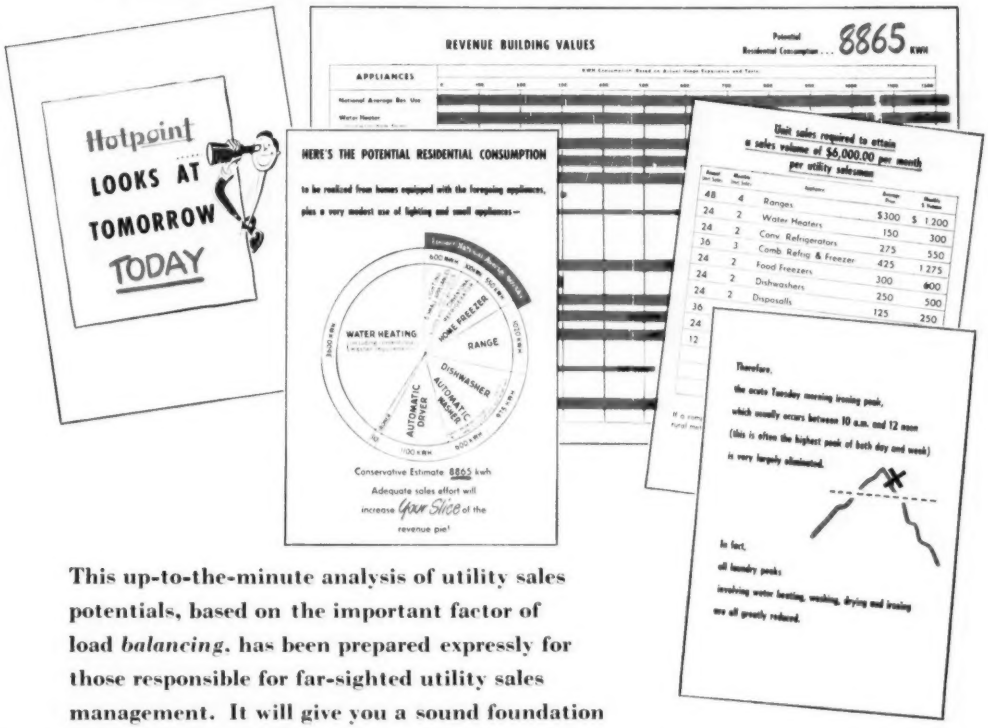
Strategic display space in Washington Water Power Co. offices, available to all dealer members of the Inland Empire Electrical Dealers Assn., was used recently by Coeur d'Alene members in presenting "America's Outstanding Radio Values." This cooperative display, showing cards for each dealer's product, was sponsored jointly by City Electric, Powerhouse, Atlas Tire, Burch's Furniture, Cope Electric, Koenig-Kennedy Appliances and Whiteley's Electric Co.



"Every utility sales executive in the country should see this new study of balanced load building possibilities"

Fred A. Compton
Vice President in charge of Sales
Detroit Edison Company

...and we'll be glad to show it to them, Mr. Compton


Hotpoint
LOOKS AT TOMORROW
TODAY
REVENUE BUILDING VALUES
Potential Residential Consumption ... 8865 KWH
APPLIANCES
HERE'S THE POTENTIAL RESIDENTIAL CONSUMPTION
to be realized from homes equipped with the foregoing appliances, plus a very modest use of lighting and small appliances—
WATER HEATING
HOME FREEZER
RANGE
DISHWASHER
AUTOMATIC DRYER
AUTOMATIC WASHER
Conservative Estimate 8865 kwh
Adequate sales effort will increase Your Slice of the revenue pie!
Unit sales required to attain a sales volume of $6,000.00 per month per utility salesman
Ranges $300 $ 1,200
Water Heaters 150 300
Conv. Refrigerators 275 550
Comb. Refrig. & Freezer 425 1,275
Food Freezers 300 600
Dishwashers 250 500
Disposalls 125 250
Therefore,
the acute Tuesday morning ironing peak,
which usually occurs between 10 a.m. and 12 noon
(this is often the highest peak of both day and week)
is very largely eliminated.
In fact,
all laundry peaks
involving water heating, washing, drying and ironing
are all greatly reduced.

This up-to-the-minute analysis of utility sales potentials, based on the important factor of load *balancing*, has been prepared expressly for those responsible for far-sighted utility sales management. It will give you a sound foundation for a constructive sales program for 1950 . . . a program that will also please the dealers in your territory and stimulate their cooperation.

Hotpoint

Just get in touch with *The Hotpoint Committee on Cooperation with Utility Executives, Hotpoint Inc., 5600 W. Taylor Street, Chicago 44, Illinois.*

THE MONTH IN BRIEF

City Light Offers to Take Customers

Newspaper advertisements proposing that Seattle City Light relieve Puget Sound Power & Light "of some of its load by taking over part of its customers now," appeared last month following the city's withdrawal from purchase negotiations. Enlarging on the idea in City Light's house organ, "City Light News," P. C. Spowart declared that the department will have sufficient capacity in 1953 to take over the company's entire Seattle load; enough in 1952, when the Puget Power franchise expires, to take over most if not all of the load. Stating that he does not believe that the company will go out of business when its franchise expires, he pointed out that the city has been attempting to buy company properties since 1929. Puget Power, he continued, did not offer to sell until 1947, four years after Seattle served notice that it planned to expand to serve the entire city. Comment of Frank McLaughlin, Puget Power president: "Apparently they want our customers but not our facilities."

Power Company Joins Suit

Puget Sound Power & Light Co. has joined in the suit instituted in Thurston County to test constitutionality of the 1949 law authorizing joint acquisition of electric utility properties by two or more PUDs. Olympia firms and individuals bringing the suit seek to prevent Thurston County PUD from joining seven other districts in purchase of Puget Power properties. (EWEST, November, p. 104.) The power company entered the litigation as an intervenor. It advocated the 1949 law, since it prefers over-all acquisition, rather than piecemeal condemnation, of its properties.

Rehearing Asked on Wheeling Clause

Idaho Power Co. has asked the FPC for a rehearing on its order requiring the company to wheel federal power on any excess capacity of transmission lines being constructed from its Bliss hydroelectric plant (EWEST, November, p. 104). In its petition, the company charged that the commission's Oct. 13 order violated both the first section of Article 1 and the Fifth Amendment to the Constitution of the United States. "Unreasonable and arbitrary" conditions and requirements of the order, as set forth in the petition, include: conversion from 138- to 230-kv. lines at the request of the Secretary of the Interior; competitive use of the lines by the government; negotiation provisions for interconnections; requirement of 30-month notice by the company for withdrawal of capacity from government use; "indefinite and uncertain" provisions.

Company Granted Kings River License

Refusing to reserve development of the Kings River Basin for the Bureau of Reclamation, FPC last month authorized a 50-year license to Pacific Gas and Electric Co. for development of the river. The decision followed recent hearings in Washington, D. C., to discuss exceptions to an earlier recommendation by an FPC examiner that the basin be developed by the federal government. It could not agree, the commission said, with the Bureau of Reclamation that "these particular water resources should be reserved exclusively for possible development by the United States." It pointed out that, as a result of a Presidential directive last August that bureau plans did not contain sufficient information on engineering and economic feasibility to justify their approval as a comprehensive valley plan, Upper Kings River power projects were excluded from the revised list sent to Congress. Fresno Irrigation District had requested a preliminary permit covering the same facilities as those in the PG and E application. FPC allowed the company's request on grounds that it would more fully utilize the waters (PG and E application, approximately 274,000 kw.; Fresno District application, 144,000 kw.). However, the commission granted the district a preliminary permit for study of a proposed development at the Pine Flat Dam, under construction on the Kings River by the Army Engineers. It also authorized an amendment to PG and E's license for its existing Balch plant to cover an increase in capacity to 160,000 hp.

Voters Give Utility Franchises

Elections last month gave Colorado Central Power Co. 25-year franchises in two towns, Milliken and Johnstown, Colo. The franchise ordinances supersede existing franchises, each of which had a few years to run. In 1948, the company secured 25-year franchises in three towns—Keenesburg, Morrison and Sheridan.

BPA Cuts Firm Power Contracts

Bonneville's firm power contracts to private utilities are down 59,000 kw. from last year and short-term contracts next year may not include firm power. In granting one-year contracts totaling 311,000 kw. of firm power, Administrator Paul J. Raver declared that, by next year, load growth in Bonneville's long-term industrial and public agency commitments probably will have reached a point where there will be no firm power available under new contracts either for public or private agency customers. The new contracts give Portland General Electric 130,000 kw.; Pacific Power & Light and Washington Water Power jointly, 120,000 kw.; Puget Sound Power & Light, 50,000 kw.; Mountain States Power, 11,000 kw. Contracts permit reduction in power deliveries in February, March and April.

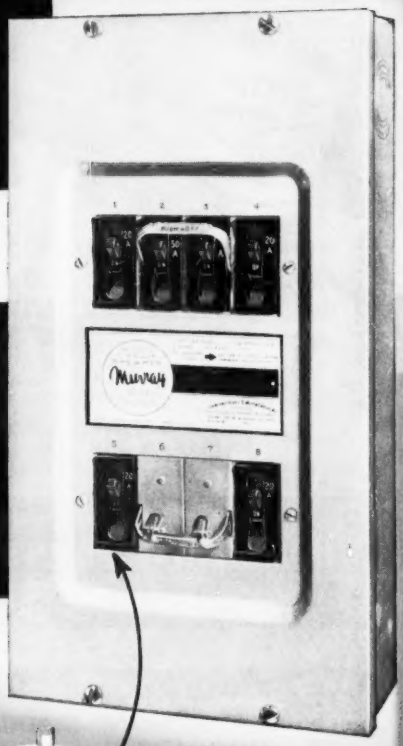
Wholesale Rate To Stand

Bonneville's wholesale power rate of $17.50 per kilowatt-year will be continued another five years, Paul J. Raver indicated last month in announcing results of a rate review. After Dec. 20, 1954, a rate increase probably will be necessary to take care of today's increased costs. Higher construction costs for eight power dams to be added during the next five years will not be a serious factor until 1953, Raver explained. The new projects, to be in operation by June 30, 1954, are McNary, Hungry Horse, Albeni Falls, Roza, Chandler, Detroit, Big Cliff and Hills Creek. (See story page 120.)

Murray
MODERN METHODS *mean Highest Quality . . . Latest Design . . . Greatest Value!*

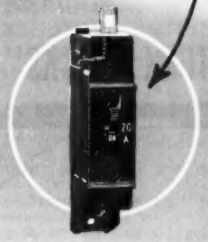
8 Circuits *in* 1 Load Center

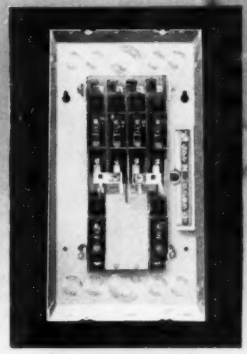
Listed by Underwriters' Laboratories, Inc.



With the World's Most Satisfactory Overload Protection:

Murray
FULLY MAGNETIC Circuit Breakers





Eight branch circuits are controlled and protected by this NEW Murray Magnetic Circuit Breaker Load Center. Utmost flexibility is achieved by *individually interchangeable* single pole breakers rated at 10 to 50 amp. Range Circuits can be accommodated by 35 or 50 amp. circuit breakers. Surface or flush mounting.

Now you can anticipate two of tomorrow's needs today: (1) more circuits, (2) better protection against overloads. Both requirements are met in the NEW Murray 8 Circuit Magnetic Breaker Load Center!

This modern new equipment brings you the latest in satisfactory overload protection — at moderate cost. As few as four breakers need be installed with the panel . . . more can be added as circuits are added! Any *individual* breaker can be interchanged with a breaker of different rating — making possible unlimited combinations, right on the job . . . and the only tool needed is a screwdriver!

In addition, each Murray *Fully Magnetic* Circuit Breaker is virtually an electrical engineer at the switch! Just see what it does: It carries full rated load indefinitely — *no derating necessary*. It accommodates heavy momentary overloads — even when carrying full rated current. Yet it trips reliably, in a reasonable time, under sustained overloads. It interrupts the circuit almost instantaneously under "short circuit" conditions. *And because it has no thermal element, it is virtually unaffected by ambient temperature changes!*

Yes, you can equip today for the loads of tomorrow — and for tomorrow's exacting standards of overload protection—with the NEW Murray 8 Circuit Magnetic Breaker Load Center. For full details, contact your Murray representative, or write

FOR TOMORROW'S LOADS . . .
Equip Today!

Murray MANUFACTURING CORPORATION

50 Years of Service to the Electrical Industry
1250 ATLANTIC AVENUE • BROOKLYN 16, NEW YORK

SERVICE ENTRANCE & METER EQUIPMENT • MAGNETIC CIRCUIT BREAKERS
SWITCHES • CURRENT LIMITING REACTORS • CROWS' NEST AERIAL LADDERS

THE MAGNO-TRONIC FLUORESCENT STARTER

PROTECTS Fully automatic thermal relay with unusually long life that eliminates blinking lights and protects all auxiliary equipment.

SIMPLIFIES Replacement of worn-out lamp automatically restores closed circuit—replacement of starter unnecessary. No button to push.

REDUCES COSTS Magno-Tronic starters provide exact timing in the lamp electrode—preheating process preventing excessive loss of emission material thereby assuring the maximum in the useful life of a lamp. The established quality of this starter saves considerable time in maintenance and man hours required to repair and/or replace an inoperative lighting unit.

VERSATILE Will operate efficiently over an extended voltage under widely varying temperatures.

GUARANTEED FOR ONE YEAR

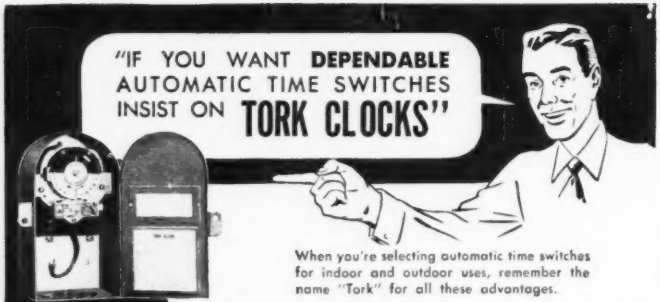
The (SP-15-20) for use with either 15 or 20 watt lamps
The (SP-30-40) for use with either 30 or 40 watt lamps
The (SP-100) for use with 100 watt lamps

Ask for descriptive literature

INDUSTRIAL ELECTRONICS CORP.

MAIN PLANT Newark 2, N. J.

"IF YOU WANT **DEPENDABLE** AUTOMATIC TIME SWITCHES INSIST ON **TORK CLOCKS**"



When you're selecting automatic time switches for indoor and outdoor uses, remember the name "Tork" for all these advantages.

IDEAL FOR:

Store Windows
Outdoor Signs
Heating and Air Conditioning Units
Safety and Street Lights
Electric Appliances
Poultry Lights
Aircraft Beacons
Home, Factory and School Lighting

DEPENDABLE ACTION! Made with exacting care from finest materials, self-starting all-electric Tork Clocks perform with complete accuracy . . . give years of steady, trouble-free service.

VERSATILE ACTION! Thanks to Tork's many special devices, all standard models can be adjusted to fit your specific needs. Our remarkable device — amazing ASTRONOMIC DIAL — allows for variations in time of sunrise, sunset. We'll gladly explain dozens of others that save extra time, trouble, expense.

EASY INSTALLATION! These compact, modern time switches install with remarkable speed and ease on walls, outlet boxes, etc. Special weatherproof case provided with outdoor models.

ECONOMICALLY PRICED AS LOW AS $9.50 LIST

Write today for free bulletins with complete product and price details.

TORK CLOCK

TORK CLOCK CO., INC. 1 Grove Street Mt. Vernon, N.Y.

THIS MONTH'S NEWS

FPC Modifies License to Provide for Recreation

To provide for recreational facilities in the Sequoia National Forest during the months from June through September, FPC has ordered Southern California Edison Co. to discharge water from the diversion dam of its Kern River hydro plant near Bakersfield, Calif., into the river channel.

The action, modifying a license order issued more than three years ago, calls for a continuous flow during the summer months of 50 cu. ft. of water per second in the channel, as recommended by the Secretary of Agriculture. The release would not be made if stream flow drops below the record minimum of 74 cu. ft. per second. In a 41-page opinion Nov. 15, FPC also reserved the right to adjust the rate of flow to recreational demands on the water.

The company had contended that the commission could not place such a condition in the license and that the release of water would prevent the company from fulfilling its contracts with irrigators below the project. Such a condition would, it was maintained, deprive the company of its property rights in the water.

FPC found that the company had not acquired property rights to the water, and the United States continues to hold riparian water rights.

Because the United States could legally deny the company use of the land for its plant, the opinion contended, it can also specify conditions for utilization of the water.

Estimates of the loss in power from the water release were cited as ranging from $13,970 annually (averaged over a period of years, according to the Department of Agriculture) to a loss of $61,000 per year (calculated by Southern California Edison and accepted by the commission).

Loss of water to irrigators under the contract with the company was considered to be of no measurable quantity.

"We are convinced," the commissioners declared, "that this stretch of the Kern River Canyon is susceptible to development for substantial recreational use and, therefore, we consider it our duty to cooperate, to the extent of our authority, with others interested in such development."

The Labor Union Monopoly Bites *ALL* Workers

What kind of government is it which:

. . . Prosecutes the Great Atlantic & Pacific Tea Company which it asserts handles about 6½% of the retail food distributing business as an illegal monopoly in restraint of trade, and

. . . Seeks to break up four big meat packing companies and make them into 14 companies, charging the four with being a monopoly in restraint of trade, but

. . . Makes no move whatsoever to apply the federal anti-trust laws to the exercise of virtually 100 percent monopoly control of labor in the coal industry, and the only slightly less complete monopoly control of labor in the steel industry?

The answer to that question is simple. It is class government of the most flagrant type, a government by which special privileges are dispensed without justice and to the great injury of all workers. It is the kind of government which will lead to the early sacking of the American enterprise system and the personal freedoms of workers.

In legal terms the explanation of this flagrant affront to good government is also simple. In 1932 labor union activities were given virtually complete exemption from the application of the federal anti-trust laws by passage of the Norris-LaGuardia Act.

continued on next page

When the Norris-LaGuardia Act was passed labor unions were relatively weak. Only about 16% of the nation's industrial workers were organized, only about 12% of the steel workers. About two-thirds of the coal miners were union members, but only half that number were paying dues. The country was in the depth of its worst depression. The unemployment of about one-fourth of the labor force made monopoly control by labor seem so remote as to be almost fanciful.

But after only seventeen years devoted to the promotion of labor union organization by the federal government, we have labor monopoly with us. In its power and scope it makes the alleged business monopolies being prosecuted under the federal anti-trust laws seem positively piddling. In its manners it makes the old-time business monopolists look like Lord Fauntleroys.

What is lacking, grievously lacking, is action by Congress; action to shape our federal anti-trust laws to take account of the labor monopoly that has become the dominant national force in our country today—a force that is leading to the loss of freedom of all workers.

Before labor monopoly is broken up, as it must be broken up if our economy is not to be permanently wrecked, other steps will no doubt be required. But one test more than any other will be the touchstone of the nation's determination to keep its economic and personal freedom. It is what it does to see that labor monopoly receives the same treatment under the federal anti-trust laws as any other kind of economic monopoly.

The purpose of the federal anti-trust laws is to break up monopoly and preserve fair competition in the United States. It is a fine purpose. The wisdom and fairness of its application in particular cases is often open to challenge. But in spite of bad administration every farsighted business man I know is a staunch defender of our national anti-trust policy.

At present, in the exemption of labor monopoly, we have a breach in that policy which, if not closed, will soon become fatal both to the policy and the enterprise system it is designed to foster and protect.

The main thing wrong today with Great Britain and indeed all Europe is that no effective anti-trust laws are in existence to protect the public from business and labor monopolies, to guarantee personal freedoms. No free economy in Europe or America can prosper as long as protected monopolies remain and flourish.

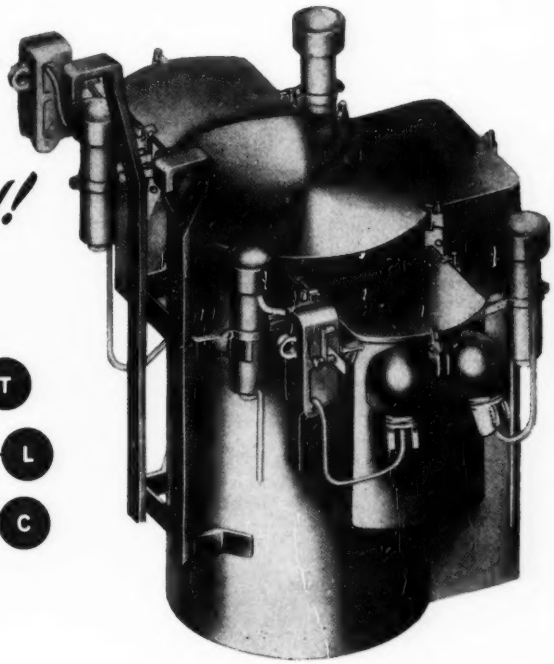
While your representatives in Congress are home with you talk to them about the special privileges now granted to labor union monopoly. You would serve your country well by finding out what they intend to do about it before it is too late.

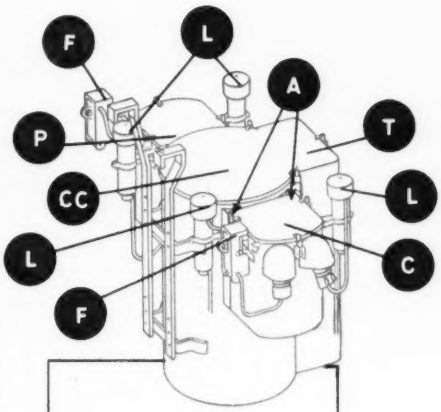
President, McGraw-Hill Publishing Company, Inc.

what's **New** in street lighting

Constant Current "Substation" —cuts installation costs by 2/3

Hoist it...
Bolt it...
Connect it...
it's installed!





CC—Constant-Current Transformer
C—Controller
P—Protector
T—Capacitor Tank
L—Lightning Arresters (Pellet type)
F—Fuse Cutout
A—Air shaft for cooling

This new General Electric outdoor substation-type constant-current regulator has all of its component parts interwired at the factory. In the field it is only necessary to bolt it on the pole or platform—connect the power and control leads.

And it saves on maintenance too. All components are in one location, yet each is readily accessible—in its own separate compartment—in its own oil. Any one component may be serviced without disturbing any other part.

And it's safer—the fuse-cutouts are located where they give positive visible assurance that the circuit is open. For complete details write *Apparatus Dept., General Electric Company, Schenectady 5, New York.*

GENERAL ELECTRIC

660-98

With factories in Anaheim, Los Angeles, Oakland, Ontario, San Francisco, San Jose, Seattle, and Richland, and Sales Offices in twenty Western cities.

BONNEVILLE FIVE-YEAR REVENUES ESTIMATED

Continuation of the $17.50 per kilowatt-year rate for another five years was announced by Bonneville Administrator Paul J. Raver last month (see page 114). Because increased construction costs for projects and transmission facilities will not enter into BPA's costs until they start operation, present rates will cover all costs of generation and transmission until about mid-1953, he said.

Here is the way Bonneville figures its finances for the next five years:

Revenues will jump from an estimated $29 million for the current fiscal year ending next June 30 to some 43.6 million in fiscal 1954. Operating costs will go from $22 million for the current fiscal year to $46.5 million in the year ending June 30, 1954. Meanwhile, by the end of fiscal 1953, cumulative net surpluses of $41 million will have been built up, more than covering the expected excess of costs over revenues for the final year of the five-year period.

But, unless present trends are reversed or there is new Congressional action on power cost allocation, the next rate review in 1954 may mean higher Bonneville rates.

BPA's look into the future was made on the heels of an independent audit, which confirmed new record high power sales and net revenues for the fiscal year ended June 30, 1949.

Audit by Arthur Andersen & Co. of Seattle showed fiscal 1949 gross operating revenues were $27,821,000, a jump of nearly $3.3 million over the previous year. Net operating revenue, after all costs, was $10.6 million.

Break down of BPA power revenues: industries including military establishments, 50.18%; privately owned utilities, 27.88%; publicly owned utilities, 21.18%; miscellaneous, .76%. Dollarwise, year's sales to industry and military jumped $1,592,040; to publicly owned utilities, increased $1,575,316; to private utilities, up $123,250.

Fiscal 1949 operations left government with gross investment in power at Grand Coulee and Bonneville dams and transmission systems of $457 million, $149 million repaid and $308 million to be returned from future power operations.

Foundation blocks for Hungry Horse Dam under construction on South Fork of Flathead River in Montana by U. S. Bureau of Reclamation. Cold weather will soon force suspension of concrete operations for the winter. The 564-ft. dam, the world's third highest, is scheduled for completion in November 1953. Power house will contain four 71,250-kw. generators driven by 105,000-hp. turbines. Photograph by U. S. Bureau of Reclamation

● CONSTRUCTION of a hydroelectric dam in the Sultan Basin of Northwest Washington state would be feasible from a physical standpoint, the Snohomish County PUD of Everett, Wash., has been informed by the Harza Engineering Co. of Chicago. Recommendation as to whether the dam should be an earthfill or concrete structure will not be made until the completion of geological studies. After construction costs have been determined, the final step will be a determination as to whether the project would be financially feasible. Another engineering firm already has expressed the opinion the project is not financially feasible.

Tests Show Impulse Wheel Efficiency

An efficiency of 92% for the multi-nozzle impulse water wheels at the Bridge River plant of the B. C. Electric Railway Co. is reported from official tests just completed. This remarkably high efficiency (probably the highest ever obtained on an impulse water wheel) resulted from a new Pelton Water Wheel Co. design. The design is unique in that it is a vertical shaft six-nozzle impulse wheel rated at 62,000 hp. at 300 r.p.m. operating under a net head of 1,118 ft. (Electrical West, August 1949, p. 60).

● HOLLY, COLO., was to vote Nov. 29 on a proposition to repurchase from Fairbanks-Morse the electric and water utilities sold back to that firm in 1929 when taxpayers were discouraged with municipal ownership. The election involves authorization of $102,050 in bonds for the generating plant and $42,620 for the water system.

● CONTRACT for two 120-in. butterfly valves for Southern California Edison's Big Creek power house No. 4 has been awarded to Westinghouse. Valves will be built at the Sunnyvale plant for delivery the latter half of 1950.

2-WAY PROTECTION WITH SQUARE D CIRCUIT BREAKERS

RESIDENTIAL and INDUSTRIAL

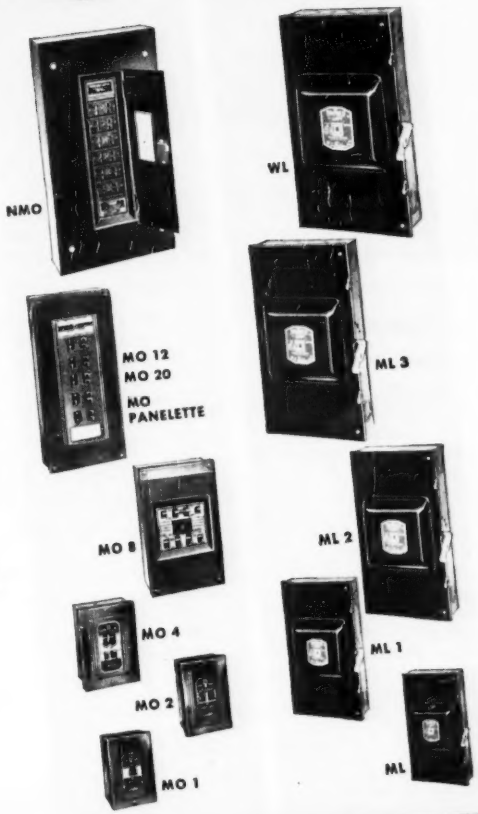
THERMAL-MAGNETIC *Coilless*

—combining the proven advantages of both Thermal and Magnetic tripping elements. They give positive protection against dangerous overloads and act instantaneously on "shorts." Useless tripping on harmless momentary overloads is eliminated.

1. **THERMAL** element is a bi-metal providing positive and timed response to heating effects of both load current and surrounding atmosphere. The life of wire insulation is prolonged by limiting total temperature to a safe value.

2. **MAGNETIC** element responds instantaneously to the higher values of current characteristic of dangerous overloads and "shorts." Damage is minimized.

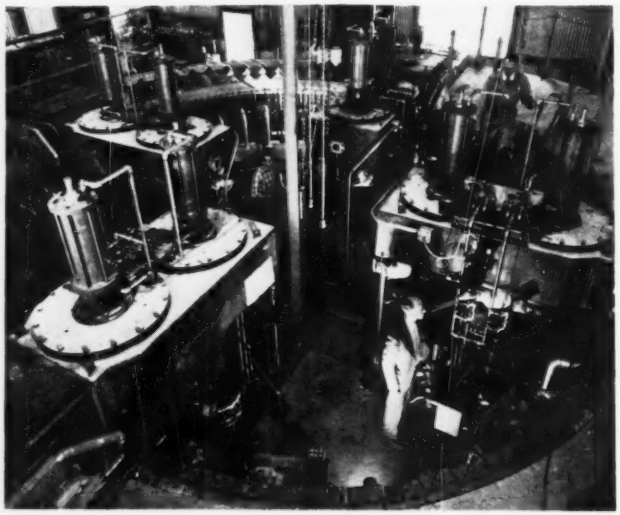
Write for Bulletin SA 590
Square D Company, 4335 Valley Boulevard
Los Angeles 32, California



SQUARE D COMPANY

DETROIT • MILWAUKEE • LOS ANGELES

SQUARE D COMPANY CANADA LTD., TORONTO • SQUARE D de MEXICO, S.A., MEXICO CITY, D.F.



Pilot model of ten-million-ton, six-billion-volt bevatron now under construction on the University of California campus at Berkeley. The six-billion-volt bevatron will duplicate nuclear disintegrations such as those occurring in the medium energy range of cosmic rays. Model is one-fourth the size of the new $9,000,000 bevatron, which is one of two machines now being built as part of the research program of the AEC

Radio Equipment to Connect Power Grid

Construction of a microwave radio transmission system to monitor the Pacific Northwest power grid in Washington and Oregon was made public recently by the Bonneville Power Administration, with the statement that the installation of point-to-point radio equipment will connect the principal junction points of the federal public power system.

Cost of the communication system will run between $2,500,000 and $3,000,000. The system will partially replace present wire circuits, radio stations and carrier line voice circuits and will be similar to microwave transmission lines used in the east for television.

According to V. M. Murray, manager of the Puget Sound district office, bids will be opened on Dec. 20 for a 26-station network reaching from Vancouver, Wash., to Spokane, Wash., via Coulee Dam and west over the Cascades via Stevens Pass to Snohomish.

● PLANS for a $65,000 substation to be constructed in Edmonds, Wash., by the Snohomish County PUD have been announced. The new station will transform directly from 55-kv. lines, relieving the present 13-kv. system.

● APPROXIMATELY $300,000 is being spent by the B. C. Electric Railway on the modernization of its Main St. substation, adjoining the new Murrin substation at Main and Georgia streets, Vancouver, B.C. Present rotary-type converters, which change alternating current to direct current for trolley coaches and street cars, will be replaced by four glass-bulb rectifier units which do the same work more efficiently.

● A DISTRICT COURT of appeal in Sacramento, Calif., has refused to hear a $300,000 damage suit filed against Pacific Gas and Electric Co. over destruction of a plane, death to a passenger and injury to the pilot. The suit charged PG and E with negligence in constructing and maintaining power lines near the Patrick Air Field, Chico, and failure to display signs or give warnings. The court held that the plaintiffs by hitting the 26-ft. high power line actually were trespassing on PG and E property.

● THE NEED for better school lighting is told through a 22-minute sound color film, *Educating in a Truer Light*, recently released by the Better Light Better Sight Bureau. Presented in a non-technical style the film is designed for use by electric utilities and leagues in promoting planned school lighting.

REACTOR TESTING STATION PLANNED FOR ARCO, IDAHO

A contract for architect-engineer services for a materials testing reactor planned for the U.S. Atomic Energy Commission's Arco, Idaho, reactor testing station was signed last week by AEC and the chemical plants division of Blaw-Knox Construction Co., Pittsburgh. L. E. Johnston, manager of the AEC's Idaho operations office, said the contract calls for cost-plus-fixed-fee, with cost estimated at $1,870,000. The new reactor which is to be used in searching for testing and construction materials for atomic power plants is expected to reach a total cost of some $20,000,000.

Power Companies Can Meet All Needs, Officials Say

Idaho Power Co. and Utah Power & Light Co. expect to be able to meet all electric power requirements in their areas—including those of the atomic reactor plant near Arco.

Executives and engineers of the two companies met recently in Boise, to complete joint plans for the expansion of electrical facilities in the area. T. E. Roach and G. M. Gadsby, presidents, respectively, of the two companies, reported that facilities in the states served will be expanded during the next five years to meet requirements both of the atomic program and of normal growth.

The Arco plant will be supplied by duplicate power sources. Transmission lines are projected to Arco from Idaho Power's American Falls facilities and from UP&L's Goshen substation.

Seattle Plans More Safety Street Lighting in 1950

A 1950 program for safety lighting on Seattle arterials that will modernize illumination on 14 principal traffic routes (adding 48 miles to the highways being improved under the $4,000,000 program approved by the city's voters) has been announced by City Engineer R. W. Finke.

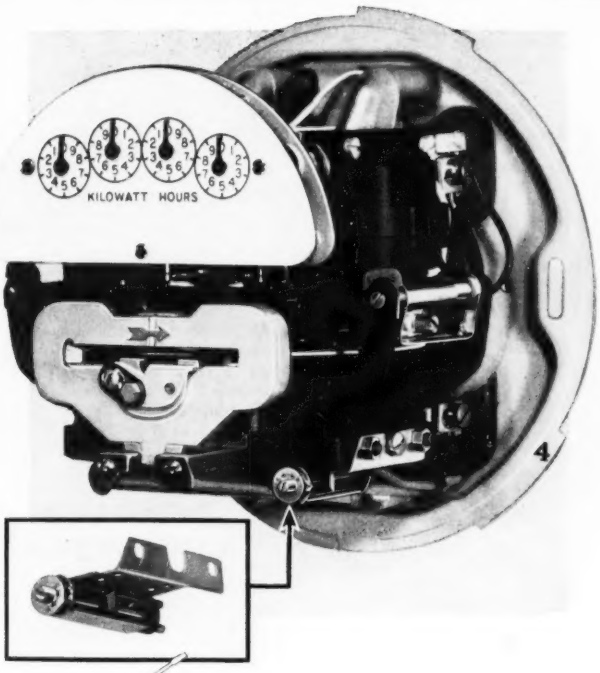
The proposed work, he estimated, will cost $850,000. "Added to the 22.5 miles that will be completed this year," Finke said, "the 1950 program will mark a big step forward in making Seattle streets, with the latest mercury-vapor lights, the best illuminated in the country. When the full 330-mile installation is complete, Seattle will have the greatest mileage of mercury-vapor lighted arterials in the United States. Denver now has this distinction."

Power Factor Compensation is easy

with the new

SANGAMO

Polyphase Watthour Meter



a screwdriver is the only tool needed

Sangamo Type LC Polyphase Watthour Meters now feature a simple, extremely accurate micrometer adjustment for power factor compensation. This device consists of a slide wire held in compressive contact with a slider mounted on a threaded shaft. The slider moves when the slotted end of the shaft is turned with a screwdriver. The slotted adjustment shaft is readily accessible from the front in both two and three-element Type LC meters. Compensation is fixed within close limits by the position of the slider on the shaft. Both slider and slide wire are gold-plated to insure positive contact.

Provision for photo-electric testing has also been incorporated in these meters. This includes the addition of a circular hole 0.07 inches in diameter, near the edge of the disk, to provide a clear, vertical path for the light beam.

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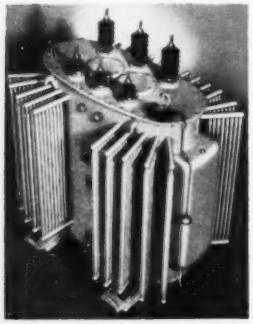
Streamlined methods of manufacturing, plus standard designs and standard parts, shorten engineering and production time to reduce prices and speed deliveries.



Single and three phase sizes up to 10,000 KVA, 69 Kv.

Transformers can be supplied with any method of oil preservation.

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PUD ASKS PERMIT TO STUDY LOW DAM ON COWLITZ

Lewis County PUD, Chehalis, Wash., has applied to the hydraulics division of the Washington State Department of Conservation and Development for permission to conduct additional exploration and development work for power purposes on tributaries of the Cowlitz River at Packwood some 15 miles northeast of Chehalis, and to build a low dam in the vicinity of Cowlitz Falls.

The 1949 state legislature ruled out any dams more than 25 ft. high on the river but the city of Tacoma, which would like to build dams on the same river at Mayfield and Mossyrock, has applied to the Federal Power Commission in hopes of overcoming the state obstacle. The PUD application to the state body is a stop-gap precaution in event the FPC should approve the Tacoma dams.

In its application to the state, the PUD declared it proposes to divert the waters of Lake Creek and Clear Fork on the upper Cowlitz and store water from Lake Creek in Packwood Lake. A 40-ft. dam at Clear Fork and a 100-ft. dam at Packwood Lake could develop 38,359 hp. within two years, according to a representative of W. C. McCrea. Tacoma engineering consultant who began making studies for the PUD in the area last year.

A five-mile diversion tunnel from the Clear Fork Dam would carry water to a power plant at Packwood Lake.

Utility Eliminates Ratchet Clauses in New Contracts

Pacific Gas and Electric Co. contracts with nine California cities have eliminated ratchet clauses to give decreases in wholesale power rates ranging from 1.4 to 5%. Largest annual drop will be an estimated $25,000 in Alameda rates.

Wholesale power agreements were revised to conform with a contract offered last spring to Redding, Calif., in which a 10% rate cut was offered along with elimination of the ratchet clause.

Vallejo Company Lowers Its Rate Schedules

Rate reductions totaling $40,000 annually have been approved for the Vallejo Electric Light & Power Co. by the California Public Utilities Commission. Domestic and commercial customers will save about 5% and industrial power users will save about 4%.

Under study by the commission is a Pacific Gas and Electric Co. application to buy 32,500 shares of Vallejo Electric stock to give PG and E full control of the company. It now owns about 46% of the stock; would pay approximately $1,400,000 for the remaining shares.

Denver Adopts NEC Without Restrictions

After more than a year's fussin' and feudin' Denver's City Council supported its Mayor Quigg Newton's campaign to bring the National Electrical Code in as the electrical ordinance of Denver without the restrictions the industry group in that city had sought to retain, namely the all-metal provision. Denver had been operating under a 40-year-old electrical code which called for rigid metal conduit even in residential occupancies. The council's code revision committee, recognizing its lack of expert knowledge, had appointed an electrical advisory committee with representatives from (1) The electrical industry, (2) the electricians union, (3) Public Service Co. of Colorado, (4) the city building inspector's office, (5) the National Fire Underwriters' staff. While their recommendations were based on the NEC, the ordinance amended the code and restricted installation to rigid metal.

Councilman C. M. Stafford, an electrical contractor, led the ordinance through the council but Mayor Newton vetoed it. He said that the National Electrical Code is endorsed unanimously by all national organizations concerned with electrical safety and that the new ordinance presented amended the NEC so much it represented only a slight improvement over the admittedly inadequate, archaic and arbitrarily restrictive former code. *Rocky Mountain News*, Denver's morning daily, joined the fight, blamed "pressure groups" for "crippling amendments." On a second attempt one councilman reversed himself and the mayor's veto was sustained. Then a vote was taken on the NEC without amendments and passed by a 5-4 vote. The ordinance was finally passed after a second reading Nov. 15.

● ROLLER-SMITH Co. of Bethlehem, Pa., by a margin of $18, was low bidder at $23,587 for furnishing an indoor, metal-enclosed unit substation and power center for the non-overflow section at the north end of McNary Dam spillway on the Columbia River near Umatilla, Ore. Bids were opened by the Corps of Engineers at Walla Walla, Wash.

YULE LIGHTING CONTEST RESUMED AT DENVER

The Christmas lighting contest, sponsored jointly by the Rocky Mountain Electrical League and the Denver *Post*, is being resumed at Denver after a hiatus since 1941, when war interrupted this annual spectacle.

Although competitive features are being confined to Denver's corporate limits, the "paint with electricity" movement has spread to all parts of Colorado and points in New Mexico and Wyoming.

Rules applying to the contest are the same as those effective during the 1930s: the city is divided into four sectors and prizes are awarded for the most artistic and ingenious electric decorations. Awards are electrical appliances donated by dealers and public-spirited citizens.

The Denver Junior Chamber of Commerce and Public Service Co. of Colorado are spearheading an enthusiastic group of civic, business, industrial and commercial organizations, which welcome back the activity that formerly established Denver as "the Christmas city of the world."

City Seeks Applicants for Light Department Post

Glendale (Calif.) is seeking applicants for the $12,600 per annum position of general manager and chief engineer of the Municipal Water, Power and Light Department. The Glendale electric system serves approximately 35,000 electric customers and distributes about 150,000,000 kwh. annually in a rapidly developing section of metropolitan southern California. It operates its own modern steam-electric generating plant.

City administrative officials have announced that they wish to consider only applicants who have had at least ten years administrative experience in utility work and who are graduate electrical, mechanical or civil engineers. They say that qualifications will be carefully considered and appointment of the person elected will be immediate and permanent.

Applications or inquiries should be submitted to the City Manager's Office, attention T. L. Sharp, 613 E. Broadway, Glendale, Calif., before Jan. 15, 1950.

● THE STATE of ARIZONA has granted Arizona Edison Co. permission to issue and sell 20,000 shares of stock at $15 a share. Proceeds will be used for expansion and development of the company's gas and electric systems.

Again Irvington leads the way . . . with the most complete line of Class "H" insulations obtainable. Now, manufacturers faced with high temperature problems can successfully meet each specific requirement from this broad line. Designers, too, faced with the need to design more compactly, or reduce weights, can select insulations exactly suited to their needs. These Irvington Class "H" insulations are furnished in many thicknesses, and widths up to 36". Complete information, and generous samples, gladly furnished on request.

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Here's a simple way to maintain your brush stock. Choose any of 8 Helwig Brush Kits. Bulletin 65 gives complete details.

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Crapo GALVANIZED PRODUCTS

ALL the strength and durability inherent in steel are combined—with definite economies—in *Crapo* Galvanized Steel Strand. Heavy, ductile, tightly-bonded zinc coatings, applied by the famous *Crapo* Galvanizing Process, provide lasting protection against corrosion.

Ask the distributor of *Crapo* Galvanized Products near you or write direct for further information!

INDIANA STEEL & WIRE CO.

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It Pays to Advertise in Electrical West

The epic story of population and industry migration Westward rivals the gold rush migrations of 1849-50. Added to the already rich and stable market afforded by the region, they make the West the nation's preeminent market for electrical equipment, materials and appliances. These are the factors that warrant special SALES and ADVERTISING attention to this market. ELECTRICAL WEST blankets the market, completely and intensively and its value as a sales builder is attested by 247 advertisers who regularly use its pages to pave the way for their salesmen.

APRIL, 1950 issue of Electrical West in supplement form, will list again Directories of Manufacturers, Western Offices and Sales Representatives, Where-to-Buy-in-the-West and Appliance Service and Repair Parts.

CENTRAL IDAHO LOOMS LARGE IN ELECTRICAL HISTORY

Central Idaho played an especially significant part in the nation's early electrical history. One of the two first belt-driven direct-current generators built by Thomas A. Edison was installed in the Philadelphia-Ketchum Smelter at Ketchum, Idaho, in 1880. The other was installed on the S.S. *Columbia* and made the historic trip from New York to Portland, Ore., and return between May and September of that year.

Irvin E. Rockwell, one of the pioneers in Idaho mining and power development, writing in the *Hailey Times* recently, tells of the incident. The West in 1880 had again captivated the imagination of Easterners. New bonanzas were being discovered and new fortunes were built up almost overnight. P. B. Widener, Philadelphia street car and railway tycoon of that era, and a group of associates became interested in mining possibilities in the Wood River Valley. The Philadelphia - Ketchum development followed. It involved 60 miles of railroad built at a cost of $25,000 per mile, and construction of the first smelter in the Pacific Northwest.

One of those involved in the promotion was Thomas Rhodes, who knew Edison and was familiar with his experiments. It is recorded that Rhodes was the persuasive individual who obtained the 25-light generator from Edison for lighting this new mining project.

As was the case with many parallel mining undertakings the Philadelphia-Ketchum development failed. The smelter and the claims were abandoned. The railroad was sold to the Union Pacific and a caretaker, Alonzo Price, was given power of attorney to dispose of any items of value.

Shortly thereafter the fabulous Minnie Moore mine was discovered at nearby Hailey and the region again became the center of speculative interest. Although some equipment from the old Ketchum smelter went into the new development, the Edison generator was overlooked and lost. Some time after 1900 a Portland dealer purchased all that remained in the smelter—old machinery, shafting and junk. Included in all probability was the generator. It was thus lost to posterity but the story of its existence was verified and recorded by Rockwell.

● FRANKLIN COUNTY PUD of Pasco, Wash., has announced it will reduce its electric power rates 10%, effective Dec. 1, to match those of adjacent Benton County.

NEWS ABOUT PEOPLE

● HENRY H. FALKNER of Salt Lake City has been appointed branch manager of Westinghouse Electric Supply Corp. at Boise, according to L. G. Berger, district manager in Los Angeles. In 1930 Falkner joined with Utah Power & Light Co. in Provo, Utah. He became associated with WESCO in 1946 as sales promotion manager at Salt Lake City. Three years later he was appointed farm sales supervisor for the southern California district of the company. In addition to his new duties he will continue to supervise the farm sales program.

● R. B. WILLIAMS, assistant district manager for the Columbia Basin project of eastern Washington, retired from the federal service on Oct. 28. He joined the bureau as a surveyman on the Flathead Project in Montana in 1912 and served in Montana, Arizona, Nevada, California and Washington before going to Washington, D. C., in 1937 as assistant commissioner. He returned to the West two years later and was assigned to the bureau's Friant division of the Central Valley project in California. In 1945 he went to the Columbia Basin project.

● B. S. ANGWIN, electronics department of General Electric Co., has been named regional sales manager of the newly created initial equipment section, tube division, Los Angeles. Headquarters will be maintained at 530 West Sixth St.

● JOHN E. GUNDERSON, vice-president of Thor Corp. in charge of its El Monte, Calif., plant, has been given the additional job of sales manager of the Western zone. RICHARD G. CHAMBERLAIN, former Western sales manager, has retired.

● WESLEY A. REED has been appointed division manager at Ajo Heights for Arizona Edison Co. He has been acting manager of the Ajo Heights division since early this year.

● G. L. MACLANE JR., formerly associated with Central Arizona Light & Power Co., has been appointed manager of the engineering laboratories of Westinghouse Electric Corp.

● DAVID HOPKINS, field sales representative for Emerson Radio & Phonograph Corp., has been advanced to Western sales manager for the firm.

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For new construction and maintenance —Everstick Anchors speed up work and provide dependable anchorage on all types of jobs. Made of resilient, rust resistant malleable iron. The toughest anchors made. Write for bulletin.

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The City of Glendale, California
invites applications for

GENERAL MANAGER AND CHIEF ENGINEER
of
Municipal Water, Power and Light Department

Salary: $12,000 year

Immediate and permanent appointment to person showing best qualifications.

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Direct inquiries and biographical data to City Manager's Office, attention: T. L. Sharp, 613 East Broadway, Glendale, California.

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All communications will be held strictly confidential.

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Submit applications before January 15, 1950.

TO MATCH power supply with public demand more quickly and economically, the single circuit unit substation fills an urgent modern need. This self-contained unit is easily moved between locations as the situation demands. While small in comparison with large central stations, these isolated installations demand even more attention to small details leading to maximum trouble-free operation, since they function with a minimum of human supervision--hence, the presence of O-B bushings on this Allis-Chalmers unit sub. Among its characteristics, pointed out by A-C, are..."Rating, 1500 kva. Voltage, 33,000-4160. Allis-Chalmers Oil-Sealed Inert Gas system for protecting oil, and 32-5/8 percent step regulator mechanism. All components arranged for easy access for inspection and maintenance; consisting of a three-phase transformer, complete switchgear, tap changer, and necessary controls, plus . . ."

BUSHINGS

ONE OF THE FINEST COMPONENTS OF *ANY* TRANSFORMER

Ohio Brass MANSFIELD, OHIO

● W. S. PULLEN will retire as vice-president and manager of the Alaska Electric Light & Power Co., Juneau, next March following 45 years of service to the industry in Alaska. Formerly of Seattle, he went to Alaska in 1904, as general utility man and chief electrician for the Alaska Electric Light & Power. He installed the first electric generating station in Sitka at the U. S. Marine Barracks in 1909 and was the first to introduce electric pipe thawing in Alaska in 1907. During a leave of absence from the power company, he served as electrical construction superintendent with the Alaska Gastineau Gold Mining Co. Pullen will be succeeded as manager by FRANZ NAGEL.

● DON PRIDEAUX, General Electric lamp department, Los Angeles, and TED SHEPHERD, Los Angeles Department of Water & Power, recently returned from the national technical conference of IES in French Lick Springs, Ind., where they helped publicize the coming national IES conference to be held at Hotel Huntington, Los Angeles, next summer.

● GAYLORD BUCK, II, son of vice-president and general sales manager of Public Service Co. of Colorado, has been transferred to the Rocky Mountain District, Denver, as district engineer for General Electric lamp department. He has been on the engineering staff of G-E lamp department at Nela Park, Cleveland, for some years.

● PHILIP R. NALDER, electrical engineer, has been appointed assistant district manager of the Bureau of Reclamation's Columbia Basin project in eastern Washington. He has been with the bureau since 1933, with the exception of war service in the Army.

● AL LEICK, senior salesman of Utah Power & Light Co., representing government and municipal accounts, recently ended his employment with the power company to join the Joslin Pacific Co., as its representative in the Intermountain area.

● GEORGE B. THOMAS, vice-president, secretary and director of Utah Power & Light Co., and L. B. FULLER, engineering consultant for the power company, both retired recently.

● FRANK F. DEMAREST has been appointed sales training manager of the Oakland zone office, Kelvinator division, Nash-Kelvinator Corp.

● WAYNE DeTILLIAN has joined the sales force of Graybar Electric Co in Spokane.

Smith

● H. GORDON SMITH has been appointed Pacific District sales manager for General Electric Co.'s appliance and merchandise department, San Francisco, succeeding the late B. M. Tassie, who died Oct. 31. Before coming to San Francisco in 1948 as assistant Pacific District manager, Smith was manager of the G-E appliance and merchandise department in Jacksonville, Fla.

● ROBERT BURDETTE, a business representative of Local 46, IBEW, Seattle, recently resigned after the defeat of William Gaunt for re-election as business manager of the local. Both had been active in the Electric Club of Washington.

● JAMES SCALES, general sales manager of Leo J. Meyberg Co., San Francisco, has resigned. Milton G. Sanders, assistant to the president of the firm, is temporarily handling sales management duties in addition to his regular job.

● A. RALPH KLUCKNER, superintendent of training for B. C. Electric Railway at Vancouver, has been made vice-president of the Pacific Northwest Personnel Management Assn.

● CHARLES WHITNEY has been appointed head of sales activities in the San Fernando Valley for Mercury Television & Radio Corp., Los Angeles.

● T. C. STAVERT, former southern hydro superintendent, Southern California Edison Co., has been promoted to assistant superintendent of hydro generation.

● A. H. JAEGER is Pacific manager, located at Seattle, for Hotpoint's newly created electric utility division.

● PAUL LEBENBAUM, electrical engineer for Southern Pacific, retired from active service recently. L. F. WILLIAMS, assistant electrical engineer, succeeds him. G. W. KAHLER, formerly electrical inspector for Southern Pacific at San Francisco, has been appointed assistant electrical engineer.

● FRANK TRUNICK has been named sales manager of the television unit of Westinghouse Electric Supply Co.'s Vernon branch. This new position was created in conjunction with the company's plan to separate its television sales from its appliance division.

● DR. CHEN TO TAI of Soochow, China, has been appointed senior research physicist in Stanford Research Institute's department of electrical engineering. He will be in charge of the theoretical section of the institute's Aircraft Radio Systems Laboratory.

● FORREST D. NORBERG, Salt Lake City, has assumed duties as director of safety and first aid for Utah Power & Light Co. Associate safety director will be W. JACK ELIASON of Ogden, Utah. They will maintain headquarters in Salt Lake City.

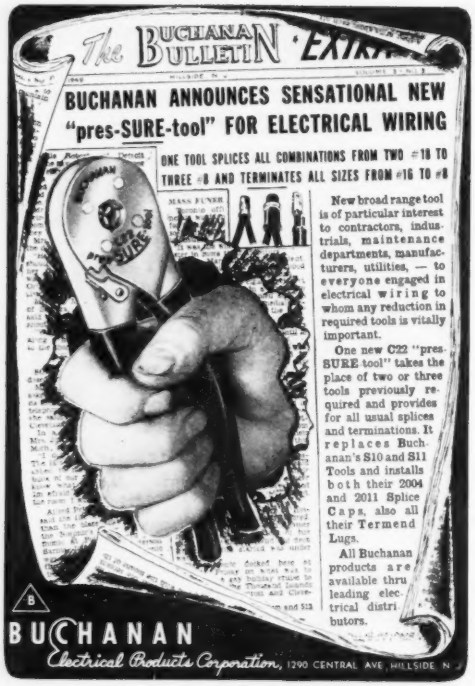
● GEORGE C. BLAIR, retired supervisor of Southern California Edison Co., has been elected chairman of the San Bernardino Park Commission, which is considering a ten-year park plan for the city.

● ALFRED E. DREW has been reappointed to the Los Angeles Board of Public Utilities and Transportation for another term to run until July 1954.

Deaths

● GEORGE M. RANKIN, 61, director of lighting development for the commercial department of Southern California Edison Co. for the past 20 years, died of a heart attack Nov. 9 at his home in Glendale, Calif. Prior to his association with the Edison company, Mr. Rankin was in the electrical contracting business in Selma, Calif.; worked with the utilities in San Francisco; then with the Pacific Coast Electrical Bureau. He was a fellow of the IES, a past regional president, past chairman of the Southern California Section and member of several national committees of that society.

● FRED SCHMITT, one of the pioneer electrical contractor's of Oakland, died Nov. 15. He was over 70 years of age and had always been an active member in the Alameda County association activities.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New broad range tool is of particular interest to contractors, industrials, maintenance departments, manufacturers, utilities, — to everyone engaged in electrical wiring to whom any reduction in required tools is vitally important.
One new C22 "pres-SURE tool" takes the place of two or three tools previously required and provides for all usual splices and terminations. It replaces Buchanan's S10 and S11 Tools and installs both their 2004 and 2011 Splice Caps, also all their Termend Lugs.
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MINERALLAC

● JACK T. CONNORS, supervisor of electrical dealers' representatives in the dealers' and builders' department of Public Service Co. of Colorado, died recently in Denver after an illness of two weeks. Mr. Connors was one of the pioneer salesmen of the electric light and power industry in Colorado. He was employed by the Denver Gas & Electric Co., predecessor of Public Service Co. of Colorado, in 1901, serving some time as the first purchasing agent for the company. He later transferred to sales work and was made commercial manager of the utility property at Ashbury Park, N. J. He was afterwards made commercial manager of the Pueblo Gas & Fuel Co., and finally returned to sales work in the Denver property, rising to become supervisor of domestic sales representatives.

● PETER DIEDERICH, 68, superintendent and chief engineer of the Glendale public works department, died on Nov. 1 of a heart attack. He had headed the department since 1919 and been a city employee for 40 years. Mr. Diederich was a Fellow of AIEE and a member of the Los Angeles Electric Club for many years.

● DAY WARD, 63, superintendent of the Portland steam heat department of Pacific Power & Light Co., died of a heart attack recently. Mr. Ward was a veteran of more than 35 years of service with the organization. He started with the former Northwestern Electric Co. as a steam fitter in 1914.

● MICHAEL S. GLENN, 59, commercial and industrial representative for the Northwestern division of Pacific Power & Light Co., died recently following several months of illness. During his 30 years with the company in Portland, he became well known among business men for his lighting and illumination work.

● FREDERIC S. BEACH, retired Portland design engineer of Pacific Power & Light Co., died on Nov. 3 in Seattle. During his 26 years with the company he contributed many mechanical innovations to the steam, electric and transportation departments. Mr. Beach joined the engineering staff of the former Northwestern Electric Co. as a mechanical engineer.

● W. CHESTER MORSE, 73, civil engineer and civic official of Seattle, died there recently. He was appointed city engineer in 1927, filling that position for two years. He also served briefly as City Light superintendent and in 1938 became water superintendent.

NOTES ON THE TRADE

New Repair Shop At Denver

Some 600 attended the opening on Nov. 3 of Westinghouse Electric Corp.'s new $250,000 repair shop and warehouse at Denver. The quarters at 200 Rio Grande Blvd. give approximately 20,000 sq. ft. of floor space to the repair section and 10,000 sq. ft. for warehouse purposes.

Construction has been under way since September 1948. The plant is designed to repair electric motors ranging from fractional horsepower to 2,500 hp.

Westinghouse has had a repair shop in Denver for 25 years. Former location was at 980 Cherokee St.

● PERMANENTE Metals Corp. has changed its corporate name to Kaiser Aluminum & Chemical Corp. The corporation's sales subsidiary will be renamed Kaiser Aluminum & Chemical Sales Inc. The change was made to achieve a closer identification with the company's principal products, the announcement said. With headquarters at Oakland, Calif., the corporation has aluminum plants in the West at Spokane, Tacoma and Permanente, Calif.

● HERBERT H. HORN Inc., Los Angeles, has opened a new million-dollar building at 915 Mateo St. The building has 55,000 sq. ft. and includes an 80-ft. auditorium complete with stage and a working model kitchen staffed with home economists. The company was recently made a distributor for Telechron clocks.

● ANACONDA WIRE & CABLE Co.'s plans to manufacture aluminum conductor reinforced cable were outlined at a five-day Western division meeting of that company's representatives at Denver recently.

● A. J. ELGGREN & SONS Co., 428 S.W. Temple St., Salt Lake City, will represent Delta-Star Electric Co. in the states of Idaho and Utah.

● FRED BENZ Co., manufacturers representative, formerly located at 287 Minna St., San Francisco, has moved to 444 Brannan St. in San Francisco.

● HYGRADE RADIO Ltd. has bought the business of Radio Sales Ltd. and has its head office in Vancouver, B. C., with branches at Seattle and Victoria.

PLASTIC COVERS— Here are those new streamlined PLASTIC COVERS you've been hearing about. They are being shipped out as fast as they come off the molds, and you should hear some of the swell compliments we have been receiving — "Why didn't you produce these before?" — "The best change made in test switch covers," etc.

Cat. 204PF, 4½" base
Cat. 207PF, 7½" base
Cat. 209PF, 9½" base
Cat. 211PF, 11½" base
} Front Connected

Cat. 204PB, 4½" base
Cat. 207PB, 7½" base
Cat. 209PB, 9½" base
Cat. 211PB, 11½" base
} Back Connected

Pleasing to the eye, precision molded of heavy black Textolite, and being fully insulated, they cannot cause a short circuit when installing or removing. Specify them on your next order.

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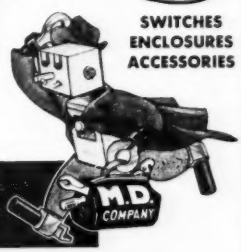
JOHN G. CORRIN, 600 S. Highland Ave., Los Angeles 36, Calif.



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Minimize your voltage losses. Specify scattered transformers to eliminate duplicate conduit runs, and save on power costs.

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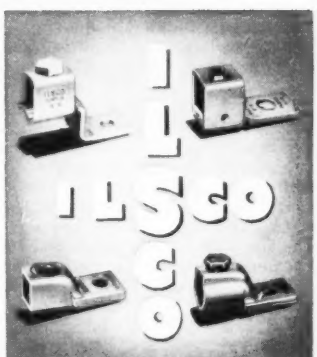

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Demonstrating the color warmth of the new fluorescent deluxe lamps. H. J. Chanon, right, was aided by Rube Lagerstrom and Jim Fearnough and a model

Two New Lamps in White Fluorescent Ranges

A whiter "white" with some deep red in it has added two new lamps to the range of so-called white fluorescent lamps, produced by General Electric lamp department. First announcement and showing of the new light source was made at a series of meetings throughout the country. The Western meetings were conducted by H. J. Chanon of headquarters staff, recently of the Los Angeles division.

With this presentation General Electric is suggesting to the industry that it change the nomenclature from the 4,500 and 3,500 kelvin ratings to a "standard cool white" and a "standard warm white." Thus it calls the new lamps a "deluxe cool white" with the deep red in it and a "deluxe warm white" with the deep red.

Less efficient from a lumen output, the new lamps however, provide a much better color correction. It is suggested that they be used wherever there are needs for color rendition and where efficiency is not as important. These uses would include social environments, such as homes, restaurants, specialty shops, meat cases, certain displays. These lamps can be mixed also with the cool light in offices to correct a lack of color response from normal standard lamps. Prices will be slightly higher. The 40-watt lamp will be put on the market first and other fluorescent types as fast as they can be manufactured.

● Thompson & Holmes Ltd., San Francisco, has received distributorship in northern California and western Nevada for the Capehart line of television and radio receivers, according to the Capehart-Farnsworth Corp. of Fort Wayne, Ind.

● Leo J. Meyberg Co. is building a new warehouse and sales room at Los Angeles St. and Butler Ave. in Fresno. Estimated cost of the new structure is $150,000.

● Rome Cable Corp. of Rome, N. Y., has acquired the Andersen-Carlson Mfg. Co. of Torrance, Calif., manufacturers of electric metallic tubing. The California plant will continue operation under direction of Arthur A. Andersen, president, and Gilbert Woodill, executive secretary. Sale of Andersen-Carlson tubing has been handled by Rome Cable since the start of production in October 1948.

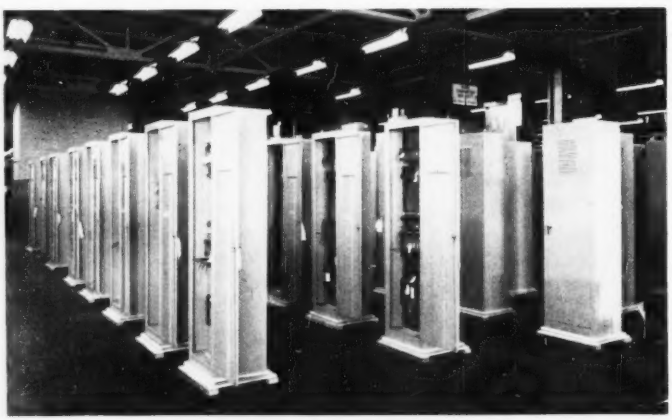
● Robert H. Bishop, vice-president in charge of sales, Sylvania Electric Products Inc., from New York City, visited the Western offices of Sylvania early in November. After informal meetings with the staff and customers, Bishop, in Los Angeles at a press conference, announced the establishment of a Pacific Coast warehouse and assembly factory in Vernon, and that a warehouse would soon be established in the San Francisco area. Immediately following Bishop's visit, Fred Fulle, merchandise manager of the fixture division, addressed meetings of contractors and engineers on late developments in light sources and fixtures and the new slimline lamps. A feature was the Sylvania Flexi-Module ceiling which was first presented at the NECA meeting in Texas. Garlan Morse, director of Pacific Coast sales, conducted the Western meetings on these two occasions.

● Woven Wire Fabrics Division, John A. Roebling's Sons Co., announces the appointment of the following new agents for insect wire screening, galvanized hardware cloth and industrial wire cloth: Flynn & Enslow, San Francisco; Industrial Wire Products Corp., Los Angeles; Pacific Wire Works Co., Seattle.

● G. E. Dangler has recently been made zone manager of the commercial cooking equipment department for Hotpoint Inc., with headquarters at San Francisco, Western Merchandise Mart. Dangler heads the commercial sales activity for the eleven Western States.

● William Brand & Co., manufacturers of the Turbo line of electrical insulating materials, has appointed Mitchell C. Hirsch, C. H. Mitchell Co., Los Angeles, as sales representative for the state of California.

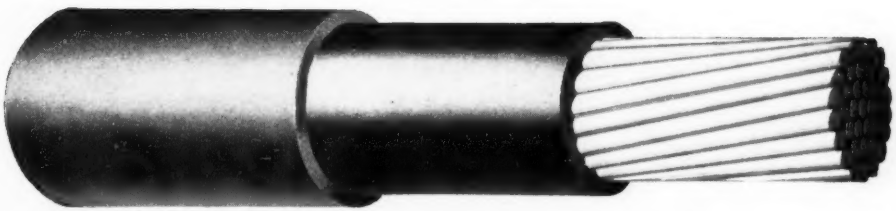
Final cabinet assemblies of PTM microwave radio relay equipment for Bonneville Power Administration is here shown at Clifton, N. J., plant of Federal Telephone and Radio Corp. The entire system will be factory tested under simulated field conditions before shipment. The completed FTR microwave system will be installed by the Bonneville Power Administration to provide additional channels in a 200-mile area throughout Oregon and Washington



Famous since 1932...

Better than ever Today

Time-tested since 1932 under all service conditions, subsequent improvements provide additional security in this long-famous network cable.



ANW
Anaconda Net Work

Tough, easily handled, Type ANW-insulated, neoprene-jacketed cable incorporates six important advantages . . . important to you for underground duct installation.

1. Better heat and flame resistance—protected by the same neoprene jacket as Anaconda mining cables which must and do meet the severe flame test of the U.S. Bureau of Mines.

2. Higher resistance to duct acids and alkalies—years of experience with Type ANW insulation with only a braid covering showed it to be highly resistant to oils, acids and alkalies encountered in soil and sewage waters. NOW it has the additional protection of the neoprene jacket which itself has shown by test and experience, excellent resistance to these agents of destruction.

3. Higher operating temperature—now 75 C copper temperature, continuous duty.

4. Superior aging—Type ANW insulation has demonstrated year after year . . . and now even better . . . long-aging characteristics under severe oxygen bomb and air bomb tests.

5. Low moisture absorption—Type ANW insulation has always had low moisture absorption . . . far less than is detrimental to safe operation.

6. More easily handled—passes 180 degree cold-bend test at 0° C without damage to jacket. Cable is lighter, easier to pull. No lead to fuse, insulation and jacket do not support combustion.

4946

ANACONDA from mine to consumer

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25 Broadway, New York 4, N. Y.

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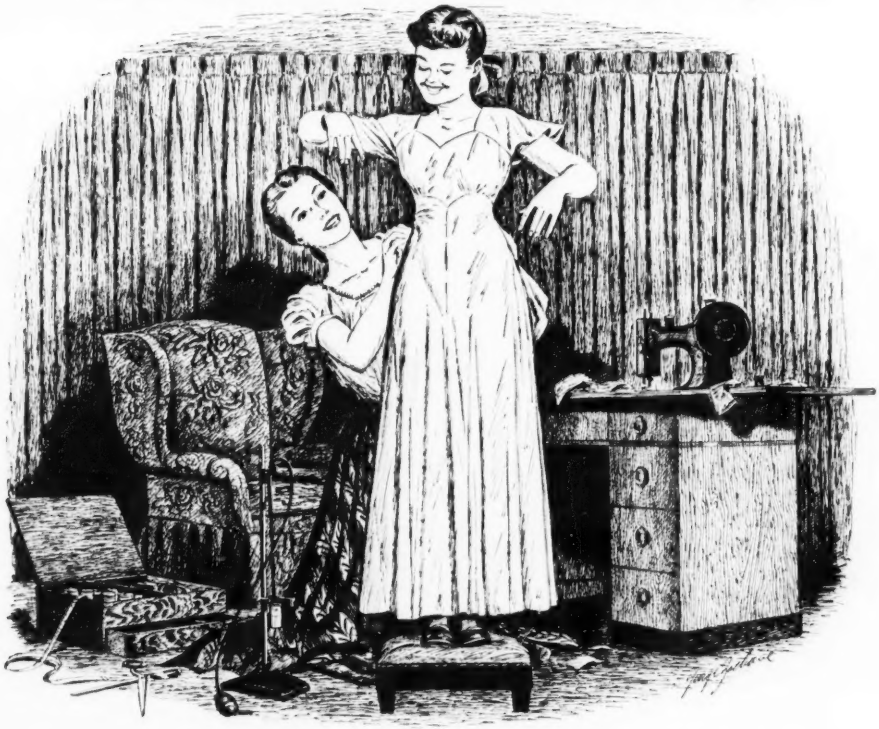
PROFILES

Joseph F. Sinnott, at right, is president of the San Diego Electric Club, which again this year is sponsoring a youth education program in electricity among the high schools of San Diego. Sinnott is protection engineer for San Diego Gas & Electric Co. and is also active in AIEE committees, besides being a photograph hobbyist

Below: Conferring on plans for the AIEE 1950 summer and Pacific general meeting at Pasadena next June are committee members from the Los Angeles Chapter: N. B. Hinson, director; M. V. Eardley, vice-chairman; Fred Garrison, general chairman; and E. L. Bettannier, secretary of the committee

H. R. Halpenny, right below, has been appointed vice-president and executive engineer of California Electric Power Co. He has been a member of the staff since 1910. Also promoted were, left to right, H. E. Pangborn, now general superintendent; W. B. Loper, new chief engineer; W. T. Johnson, made assistant executive engineer. All will report to Halpenny in the new company set up

She sewed a dress for ½ cent's worth of electricity

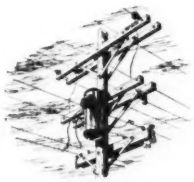


One of the many reasons why it's good to live in California is the high standard of electrical living. Californians buy and use many electrical servants without stint because the electricity to run them costs so little. For example, the electricity to operate a sewing machine to sew up a dress costs only half a penny—that is less than the price of the thread used. Your electricity bargain is hard to beat.

For the handy man and his hobby and repair shop, small electric motors help do a better job at less monthly cost than the price of a bottle of liniment. A lot-sized hedge, for instance, can be trimmed electrically for about 50 cents a year.

Behind the wall plug where you get the electricity to run a sewing machine, radio or clock, is a vast electric system of 72 power plants, scores of substations, 49,900 miles of transmission and distribution lines and almost 17,000 employees.

For the record



The poles, transformers and wires in your community are pieces of local property. They are taxed just like your own house and lot. In your city and county, P. G. and E. is one of the largest taxpayers contributing to local schools and government.

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ACCENT ON LIGHTING

Accent lighting is a "must" where merchandise is dramatized and showmanship is used to the fullest extent, as shown in the picture above. Such windows become "shopper stoppers" because light on attractive merchandise compels attention. Keep your eyes open for lighting opportunities in your neighborhood and then do some pre-planned selling. Then you can come back to your prospects with ideas and lighting layouts. And remember . . . you can always get help from power company engineers on wiring specifications, lighting layouts and the like. Right after the holidays is a good time to go after store lighting business. Start working on them now!

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